Library

SECOND SERIES VOL. IV, No. 6

BULLETIN

OF

THE NEW YORK ACADEMY OF MEDICINE

JUNE, 1928

INSTITUTED 1847

PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
Fifth Avenue and 103rd Street
NEW YORK, N. Y.

SECOND SERIES VOL. IV, No. 6

BULLETIN

OF

THE NEW YORK

ACADEMY OF MEDICINE

JUNE, 1928

INSTITUTED 1847

PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
Fifth Avenue and 103rd Street
NEW YORK, N. Y.

Entered as second-class matter, February 3, 1928, at the postoffice at New York, N. Y., under the Act of August 24, 1912.

Subscription $2.00 per year. Single copies, 25 cents.

CONTENTS

Papers delivered at stated meetings:

SYMPOSIUM ON ALCOHOL, February 2, 1928

I. Alcohol—its Public Health Aspects, its Abuses and Uses, CHARLES NORRIS 690

II. A Study of the Alcoholic Content of Autopsy Material, and its Bearing on the Cause of Death, ALEXANDER O. GETTLER 715

DISCUSSION: HAVEN EMERSON 728

Abstracts of papers delivered at section meetings:

Section of Medicine, April 17: E. H. L. CORWIN 735

Combined Meeting of the Sections of Otology and Laryngology and Rhinology, April 25: SAMUEL J. KOPETZKY 751

Section of Otology, May 11, 1928: JOHN HORN, CLARENCE H. SMITH, MARK J. GOTTLIEB 766

Proceedings of Academy Meetings 772

Notes:

Academy Collection of Portraits 777

Fellows elected May 3 and 17, 1928 777

Recent Accessions to the Library 779

Deaths of Fellows 782

OFFICERS AND STAFF OF THE ACADEMY

1928

President

SAMUEL W. LAMBERT

Vice-Presidents
CHARLES A. ELSBERG
WILLIAM H. PARK
JOHN E. JENNINGS

Recording Secretary
FENWICK BEEKMAN

Treasurer
SETH M. MILLIKEN

Trustees

JOHN A. HARTWELL
JAMES ALEX. MILLER
GEORGE D. STEWART
ROYAL S. HAYNES
EUGENE H. POOL
BERNARD SACHS
CHARLES L. DANA
SAMUEL A. BROWN
ARTHUR B. DUEL
WALTER L. NILES

Council

The President
The Vice-Presidents
The Trustees
The Treasurer
The Recording Secretary
The Chairmen of
Standing Committees

Director
LINSLY R. WILLIAMS

Assistant Secretary
FREDERICK P. REYNOLDS

Assistant Treasurer
RODERICK V. GRACE

Librarian
ARCHIBALD MALLOCH

Consulting Librarian
FIELDING H. GARRISON

Executive Secretary
Public Health Relations Committee
E. H. L. CORWIN

Legal Counsel
FRANK L. POLK, ESQ.

BULLETIN OF
THE NEW YORK
ACADEMY OF MEDICINE

VOL. IV. JUNE, 1928 No. 6

PAPERS DELIVERED AT STATED MEETINGS

Symposium on Alcohol, February 2, 1928

I.

ALCOHOL—ITS PUBLIC HEALTH ASPECTS, ITS ABUSES AND USES

CHARLES NORRIS
Chief Medical Examiner, New York City

I little realized in accepting the invitation to address you to-night upon "Alcohol in Relation to the Public Health, Its Uses and Abuses" how hazardous a subject it is. At times I have been panic-stricken at the difficulty of the undertaking.

Alcohol in itself is inflammable and recent events bear me out in this statement. The consumption of alcohol has always been accompanied with grave social consequences. It is no recent subject. The drinking of alcohol derived from natural fermentation has Biblical sanction. Its use by Christian people has been universal throughout the ages. Restriction of the use of alcohol, except in Mohammedan countries, may be said to have originated less than a century ago and in this country.

Prohibition, first established nationally as a war measure, has created in our country a situation wholly deplorable. The arguments advanced for and against prohibition have become cloaked in a dress of false statements, which may be best described as grotesqueries of fancy without solid foundation or adequate investigation of the facts. Alcohol has become almost a political issue, both parties jockeying at the start of their political conventions. This

is most unfortunate. *Salus populi suprema lex* in all the discussions that I have seen has been completely overlooked and forgotten. This, in my opinion, is the supreme issue.

Alcohol, briefly, is a product of the fermentation of a large variety of substances which contain starch or sugar. It is a natural product which arises during fermentation outside of the body as well as in the bodies of all animals including man.

Let us confine ourselves to the medical aspects of the subject. First, the action of alcohol on man. In a book entitled "The Action of Alcohol on Man" by Ernest H. Starling, of the University College, London, with his associates, Robert Hutchinson, Sir Frederick W. Mott and Raymond Pearl, a complete resumé is given of the physiological and the pathological relations of alcohol to medical problems and mental disorders and of the relation of alcohol to mortality. It is impossible to review this model book even briefly.

From a chapter entitled "The Fate of Alcohol in the Body," the following statements may be quoted: "Alcohol taken into the stomach is rapidly absorbed, both from this cavity and from the small intestine, absorption being complete in from half an hour to two hours. Absorption takes place into the blood stream by which it is carried to all parts of the body and is more or less evenly distributed throughout. Alcohol undergoes no change either under the action of the digestive juices or in the process of absorption. The amount in the blood and tissues after absorption is complete therefore varies with the size or dose which has been taken. The rate of absorption is more rapid when the alcohol is administered in a strong solution and on an empty stomach. It is slowed by dilution of the alcohol and by its administration along with or shortly after food. Milk is especially efficacious in slowing this absorption. The alcohol after attaining its maximum concentration gradually diminishes in amount. The rate of diminution is not altered by increasing the dose so that the bigger the

dose the longer is the time necessary to free the body entirely from alcohol. Only a very small proportion of the alcohol is excreted by the breath and kidneys unchanged. This may amount, for small doses, to 2 per cent. of the total alcohol taken and never exceeds 10 per cent. The disappearance of alcohol from the blood is due to its complete oxidation in the tissues. In one of Mellanby's experiments, after the administration of 50 c.c. of alcohol to a dog, oxidation took place at the rate of 2.5 c.c. of alcohol per hour. In an experiment on a man of 70 kilos, Mellanby found that after the administration of 150 c.c. in the form of whiskey, 10 c.c. of alcohol were oxidized each hour, so that it would require 17 hours to free his body from a dose of this size (170 c.c. absolute alcohol would be equivalent to about three-quarters of a pint of undiluted whiskey)."

It has been strenuously denied that whiskey is a food. Alcohol is a food but, although it may be used as a source of energy to the body, it is not useful for the purposes of repair. While the fats and carbohydrates serve to make good the store depots, proteins are necessary to replace the losses of the working tissues by wear and tear. It has been estimated that one gram of carbohydrate yields 4 calories, one gram of protein 4 calories, one gram of fat 8.9 calories. The caloric value of one gram of alcohol is 7 calories.

It should be possible in an animal neither gaining nor losing weight to replace say 70 grams of carbohydrate in the diet by 40 grams of alcohol and find the evolution of energy by the body, the rate of combustion and the weight of the body, unchanged. "On the other hand, if 40 grams of alcohol be added to the diet in such circumstances, so that the man is now taking 40 times 7 equals 280 calories per day more than he was before, the combustion of the alcohol should preserve some of the fat or carbohydrate from oxidation, since the energy demands on the body are not increased. The fat or carbohydrate remaining in the body, which is thus spared from oxidation, will be stored for the most part in the form of fat, so that the body weight should be increased and the respiratory exchanges should

show us that this increase is due to the storing up of fat or possibly, to a small extent, of animal starch or glycogen.

"Abundant evidence is presented that alcohol is injurious in its effects, either when taken in moderate doses or when taken repeatedly in excess over a long period of time; that this effect is exacerbated if alcohol is taken in strong concentration so as to damage the lining membrane of the alimentary canal and thus set up all kinds of secondary disorders depending on the absorption of the toxic products of digestion. Chronic alcohol excess produces not only specific nervous disorders, such as delirium tremens, etc., but also a progressive deterioration of the mental and moral qualities of the individual, while the effect of alcohol on the tissues diminishes the powers of resistance to infection, his reaction of self-protection, and by its action on the reproductive cells, tends to the elimination of the stock from the community. It has been shown that 12 c.c. of alcohol when given on an empty stomach occasionally produces an effect in diminishing powers of muscular coördination and other complex neural processes but that in nearly all cases the effects in such a dose are unappreciable when taken with a meal. Twelve c.c. correspond to a glass of beer or a wine-glass of claret, so that our conclusion must be that alcohol taken on an empty stomach will tend, if only slightly, to depreciate an individual's powers of performance, but that a glass of wine or beer taken with his lunch will not interfere with the carrying out of his afternoon's work. When the work of the day is finished, a greater freedom in the use of alcohol is permissible. Thirty-five c.c. of alcohol produces nearly in all cases effects on muscular coördination and performance which cannot be measured but would not influence a man's behavior or his powers of comporting himself with propriety as a member of society.

"Thirty-five c.c. of absolute alcohol are contained in half a bottle of light wine, claret or hock, in a pint and a half of ale, 3 ounces of whiskey (30 underproof), or in a quarter of a bottle of port. Moreover, 35 c.c. of alcohol would

only undergo complete oxidation in the body within three and a half to five hours, so that if this amount is taken with the evening meal the alcohol will have disappeared from the blood and the body tissues many hours before it is necessary to get up in the morning and commence the work of the day. Such quantities could be taken throughout adult existence without interfering with bodily health or fancy, and are sufficient to attain the beneficial results and to produce the increased pleasure in living, which are the objects of the employment of alcoholic beverages. It is probable that a man's quota could be doubled on occasion, but it must be remembered that 70 c.c. of alcohol will take at least seven hours for its complete oxidation in the body and during sleep may require ten or twelve, so that in all probability a man who has thus indulged will not be at his best when he arises the following morning."

Is alcohol a medicine? A consideration of this aspect of alcohol at this time is, in my opinion, needless. The subject was so tersely and admirably presented only some weeks ago in this hall by our President and others, that I need say only a few words. The masters of medicine before prohibition have used alcohol in all its forms, and have been strong advocates of alcohol in medicine. The master minds, such as Delafield, Janeway, Jacoby, not to mention the illustrious living, have all been advocates of alcohol at its proper time and amount. Not being a practising physician, I am more than satisfied to take their word on this subject. I believe this is a proper time for me to express my horror at the situation which has arisen in the practice of medicine by prohibition. It is the sacred duty of every upstanding and straightforward thinking practitioner and physician to voice his opinion on a public health matter of such vast importance to the community. To be brief, it needs no argument to convince anyone that alcohol is necessary in the treatment of diabetes in some of its stages. Congress has decreed that the physician can only give a patient a pint every ten days—a ridiculously small dose for any well or sick being. The whiskey prescribed is supposed to be sugar-free. Is it? It is common

knowledge that the whiskey obtained on physicians' prescriptions at drug stores and other places is not only not always sugar-free but contains poisons or deleterious substances such as diethylphthalate, that the whiskey is a fresh product, that it has been cut or, to use a common expression, monkeyed with. Congress, having insulted the medical profession by restricting its proper jurisdiction in matters wholly medical, has at the same time wrapped about its shoulders a cloak of virtuosity, hoping thus to conceal crass ignorance of a strictly scientific and medical problem, and has Volsteaded us into a dilemma leaving us no remedy to counteract this drastic measure.

I have prepared a table (No. 1) which I will not read, showing the number of positive tests for alcohol in different classes of cases for the year 1927. This table, of course, does not represent the number of cases in which alcohol is a contributory cause of death. In the final classifications made in the office, cases dying as a result of automobile accidents or other forms of traumatism are classified according to the nature of the traumatism, no attention being paid to history of alcohol. No case is examined for alcohol which has been longer in the hospital than twenty-four hours because the oxidation of the alcohol is complete by that time. Further, there are numerous cases of deaths due to illuminating gas poisoning, to falls, etc., which are signed out without an autopsy and no attempt is made to determine the presence or absence of alcohol chemically. In a paper upon Carbon Monoxide Poisoning, we determined that alcohol played a very considerable role in accidental gas asphyxiations. In one year (1923) intoxication was a known contributory factor in 69 deaths by illuminating gas in Manhattan out of a total of 261 in that Borough.

TABLE NO. 1

1927—ALL BOROUGHS

Automobile accidents	65
Trolley car accidents	4
Subway accidents	11
"L" train accidents	8
Homicides by shooting	37
Suicides by shooting	5
Homicide by strangulation	1
Homicides by stabbing	22
Homicides by assault	17
Straight ethyl alcohols	114
Straight wood alcohols	33
Fall from buildings	5
Fall down elevator shafts or stairs	31
Fracture of skull and street falls	49
Found dead in areaway	1
Found dead in bed, room, hallways, home	102
Found dead in street	24
Suicides by other means (poisons)	5
Gas cases (suicidal and accidental)	10
Shot by policeman	1
Died while at work	1
Industrial accidents	2
Died in prisons	2
Drownings	14
Foreign body in larynx	1
Cerebral hemorrhages	12
Fracture of spinal column	6
Fall from merry-go-round	1
Found dead in tank	1
Fell through window	1
	586

Highway Accidents for the Year 1927 in Borough of Manhattan

	No. alcoholic (as determined by chemical examination or history)
Automobiles	44
Auto trucks	23
Street cars	8
"L" and Subway trains	14
Railroad train	1
Horse drawn vehicles	2
Collisions	4
Total	96

In the year 1927 there were 592 highway accidents in Manhattan, of which number 431 were adults 18 years of age and over.

Through the kindness of Dr. William H. Davis, Chief Statistician for Vital Statistics of the Department of Commerce, Bureau of the Census, at Washington, I have obtained the figures in the registration area in Continental United States, which are as follows:

Table No. 2

Deaths From Alcoholism and Cirrhosis of the Liver

(Figures obtained from the Bureau of the Census, Washington, D. C.)

THE REGISTRATION AREA IN CONTINENTAL UNITED STATES

Calendar Year	Number of deaths from— Alcoholism (acute or chronic)	Cirrhosis of the Liver Total	Specified as alcoholic	Not specified as alcoholic	Death rate per 100,000 estimated population from— Alcoholism (acute or chronic)	Cirrhosis of the Liver Total	Specified as alcoholic	Not specified as alcoholic	Percent. of total population of continental U. S.
1926	4109	7591	452	7139	3.9	7.2	0.4	6.8	89.8
1925	3694	7549	480	7069	3.6	7.3	0.5	6.9	89.4
1924	3153	7344	419	6925	3.2	7.4	0.4	7.0	88.5
1923	3148	7027	339	6688	3.2	7.2	0.3	6.9	87.6
1922	2467	6977	218	6759	2.6	7.5	0.2	7.2	85.3
1921	1611	6598	158	6440	1.8	7.4	0.2	7.3	82.2
1920	900	6241	—	—	1.0	7.1	—	—	82.2
1919	1367	6704	—	—	1.6	7.9	—	—	81.1
1918	2220	7817	—	—	2.7	9.6	—	—	78.5
1917	3922	8569	—	—	5.2	11.4	—	—	73.4
1916	4161	8799	—	—	5.8	12.3	—	—	70.8
1915	2945	8439	—	—	4.4	12.6	—	—	67.5
1914	3257	8526	—	—	4.9	13.0	—	—	67.2
1913	3744	8497	—	—	5.9	13.4	—	—	65.5
1912	3183	8176	—	—	5.3	13.5	—	—	63.5
1911	2875	8310	—	—	4.9	14.0	—	—	63.2
1910	2909	7485	—	—	5.4	13.9	—	—	58.3

Note: Prior to 1921 the deaths from cirrhosis of the liver were not separately tabulated for those specified as alcoholic.

I have also obtained figures from the Record Room of Bellevue Hospital, showing the number of discharges and deaths in the four hospitals of the Department of Bellevue and Allied Hospitals for a period of twelve years, from 1914 to 1926 inclusive. The table follows:

TABLE No. 3

CIRRHOSIS OF THE LIVER

(1) Discharges (2) Deaths

Year	Bellevue		Gouverneur		Harlem		Fordham		Total	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
1914	109	41	8	6	47	13	20	5	184	65
1915	108	32	5	1	11	8	17	2	141	43
1916	124	52	7	5	23	4	12	2	166	63
1917	98	4	6	1	31	13	4	1	139	19
1918	72	20	6	3	No report		6	2	84	24
1919	80	23	0	0	No report		1	1	81	24
1920	63	16	3	0	6	2	0	0	72	18
1921	76	15	2	1	4	3	2	1	84	20
1922	55	20	3	3	6	2	6	3	70	28
1923	60	10	3	0	7	1	11	2	81	13
1924	62	24	5	4	6	3	6	4	79	35
1925	61	16	4	0	9	0	8	1	82	17
1926	95	29	7	1	5	5	5	3	112	38

War

The figures which I have briefly presented will show you that prohibition has not decreased the death rate from alcohol nor has it apparently decreased the number of cases of cirrhosis of the liver. From dry sources we learn, and from others who should know better, that it is only the volume of alcohol which accounts for the increased number of deaths from alcohol. Anyone familiar as I am with the exhibits in the morgue will realize that it is not only the volume but also the quality of the alcohol which is drunk which is of importance. In the Medical Examiner's Office, alcohol has been a cause of sudden death in a very large number of cases. Although I am unable to prove an increase, on account of the inefficient work of the Office of which the Medical Examiner is the successor, a long and intimate association with the Bellevue morgue warrants the statement that since prohibition, what is called sudden death from alcohol has increased notoriously. I believe that this is mostly due to the quality of the alcohol consumed. It cannot be denied that volume is a most important factor. No matter what the chemists may say, fresh distilled spirits, not aged in the wood, having a vile taste and odor, its sources being private or home or bootleg stills, and also denatured alcohol obtained by illicit means from Government warehouses and from plants using alcohol for commercial purposes, are responsible for the marked toxic action of the stuff which is drunk. I must leave it to Dr. Gettler to tell in his graphic way the sources of the increased toxic action of bad liquor.

There is every reason to believe that the original motives of the Anti-Saloon League were praiseworthy. The saloon was undoubtedly a grave menace to society before prohibition. However, the abolishment of the saloon was a mistake. The evils of the saloon could readily have been eliminated by judicial police action. It must be remembered that the saloon was the home of large numbers of our poor population. Many had no other place to go to for comfort and social relief. It was a pleasant meeting ground, especially among the German population. Many

saloons were pleasant places to spend an evening in, especially if one indulged in pinochle or other perfectly innocent forms of amusement. It is undoubtedly sad to realize that we possibly will never again see the charmingly decoratively wicker swinging door in the good old summer time—something entirely American and seen nowhere else. Saloons well regulated, openly free and above board, subject to police inspection and supervision, with the saloonkeeper bonded and subject to forfeiture of his bond in case of any disturbance, and strictly licensed and watched, as in the case of England, are infinitely preferable to what has taken its place, namely, speakeasies. Speakeasies spring up like mushrooms in a field over night. They are not subject to rapid police control, although it must be admitted that everybody, including the police, are aware of their location within a short time of their opening. Being without the law, with closed doors, open only to their patrons, they are subject to no police supervision. It is undoubtedly true that the speakeasies pay graft. They sell a product which is of poor quality. Except in the best places, their wares are from denatured sources. It is quite true that in some of the finer places, there are two separate kinds of alcohol sold; one good, to their special customers and at a high price, and the other denatured stuff at a low price. This arrangement seems to satisfy the goody-goodies and others, who, ostrich-like, for unknown reasons, refuse to remove their heads from the sand.

Let us turn our attention to the effects of alcohol as I have seen it upon the human body. I may state that probably I have seen more autopsies upon alcoholics than any person outside of my staff. Let me briefly summarize this experience.

One hundred and thirty-eight cases of acute and chronic alcoholism were autopsied during the year 1926 in the Borough of Manhattan. Of this number 30 were females. In four cases there was a cirrhosis of the liver; one of these was a fatty cirrhosis and another a marked hobnail; all were in males. In 68 cases there were negative findings as

to the liver, meaning by this, no fatty infiltration or cirrhosis, indicating that in about half the cases there were no lesions which were attributable to alcohol. In 32 cases the livers were very fatty and in 34 cases slightly fatty. In 102 of these cases alcohol was determined chemically, in the majority of the cases three or four plus. You will see, therefore, that in the class of cases which we have designated as acute alcoholism, namely, those subjects who die not as a result of traumatism or violence, etc., but whose cause of death is acute alcoholism, it is a striking fact that we have encountered very few cases of pronounced cirrhosis of the liver, hobnail liver. Much to my surprise, on looking over the reports of the office for one year, 1926, there are very few cases of marked fatty infiltration of the liver, which I have been brought up to believe by my German and American teachers is almost an invariable accompaniment of chronic alcoholism. Curiously enough, the fatty infiltrations, the so-called butter livers, in the straight alcohol cases are much more frequent in women than in men. I can give no reason for this disproportionate ratio. It is somewhat in contrast to the reports that cirrhosis of the liver is more frequent in men than in women, a fact which our statistics bear out.

According to Kaufman, alcohol certainly plays an important predisposing role in the causation of so-called glandular atrophy of the liver. He states that this importance has been somewhat exaggerated and that statistics show that about three-quarters of the cases of liver cirrhosis are due to chronic alcoholism, but he points out that only in a small portion of the alcoholics is a cirrhosis of the liver found. That mostly there is found a fatty liver or no change, and that cirrhosis may establish itself upon a fatty liver (Kern), and that thus the fatty cirrhoses are accounted for. In regard to the opinion held as to the cause of cirrhosis of the liver in alcoholics, it is divided as to whether alcohol has a direct action upon the liver or an indirect action by giving rise to gastro-intestinal disturbances.

Let us briefly review the experimental evidence in regard to the action of alcohol upon a living animal. Since a discussion by Dr. Welch upon a paper which appears in the Johns Hopkins Bulletin, July and August 1904, little may be said to have been done upon this subject with the exception of the classical experiments of Stockard. Please pardon my quotation *in extenso* of Dr. Welch's discussion:

"Dr. Alexander Lambert is to be congratulated upon the valuable use which he has made of the unequalled opportunities for the study of alcoholism in Bellevue Hospital. He has referred to the attempts which have been made to approach this subject from the experimental side. Probably the most extensive and prolonged series of experiments upon the pathological effects of alcohol are those which were conducted here in Baltimore by Dr. Friedenwald in behalf of the Committee of Fifty, the main results of which have been published in the two volumes of the report of the physiological sub-committee. Like most other experimentors we were unable to produce experimentally the most characteristic, although not the most common, of the morbid lesions of alcoholism, namely, cirrhosis of the liver. This negative result cannot be attributed to the short duration of the experiments or to the small quantities of alcohol consumed. It speaks in favor of the view that alcohol acts indirectly in the causation of cirrhosis, the lesion of the liver not being referable to the immediate and direct toxic action of this agent upon this organ.

"Dr. Friedenwald noted extraordinary individual variations in the susceptibility to alcohol on the part of rabbits. Whereas certain animals succumbed quickly to repeated daily intoxicating doses of alcohol, others could be kept alive for at least four years under these circumstances without presenting serious anatomical changes.

"The most common lesion which was produced experimentally was a fatty metamorphosis of the cells of the liver, the heart muscles and the kidneys. This lesion quickly disappeared after stopping the alcohol. I am not

inclined to attach as much clinical importance to the occurrence of fatty degeneration of the cardiac muscle as Dr. Lambert seems to do. This condition cannot be brought into definite relation with the symptoms which it was formerly customary to assign to it. Several years ago, in my studies of the general pathology of fever, I demonstrated that high degrees of fatty degeneration of the heart muscle could be produced experimentally in rabbits without apparent serious impairment of the force and functional activity of the heart. Of course there may occur such extreme degrees of fatty degeneration of the heart muscle that it may be supposed that the function of the muscle is seriously injured, but these are relatively infrequent cases. It is now known that most of the symptoms which were formerly attributed to fatty degeneration of the heart are the result of disease of the coronary arteries or of some form of myocarditis, and we also know that a very painstaking examination may be required to reveal some of the significant myocardial lesions. We must, however, admit that there may occur serious functional disturbances of the force and action of the cardiac muscles without definite pathological changes of the heart which we can demonstrate. In these cases there may or may not be fatty degeneration of the muscle, and, as is well known, this degeneration often enough occurs without any symptoms referable to the heart. Of course, fatty overgrowth is a quite different condition from so-called fatty degeneration of the heart, and may be a serious affection in alcoholics, especially in beer drinkers.

"Inasmuch as the special poisonous action of alcohol is primarily upon the higher nervous centers, the morbid changes of the nervous system in alcoholism are of special interest. We should distinguish between those pathological lesions of the brain, such as thickening, opacity and adhesions of the membranes, chronic pachymeningitis, edema of the brain and meninges, granular ependymitis, atheromatous arteries, etc., which are common in chronic alcoholism, but which are not responsible for the destructive cerebral symptoms of alcoholic intoxication, and those

more delicate changes of the nerve cells and their processes, revealed by the Golgi Marchi and other refined methods. These latter changes can be produced experimentally, as was shown in Friedenwald's experiments, but, as is well known, it is very difficult at present to utilize these findings in explaining the alcoholic psychosis. One of the most interesting outcomes of recent investigations has been to correlate the various distinctive alcoholic diseases of the brain, spinal cord and the peripheral nerves on the basis of the neurone doctrine, the underlying condition being a toxemia induced by alcoholic excess and manifested now in one part of the neurone system and now in another part; it may be in the form of peripheral neuritis, or of delirium tremens, or of Korsakow's psychosis, or of acute hallucinatory mania, or of alcoholic epilepsy."

For the purposes of this address it is unnecessary to review the numerous attempts to produce cirrhosis of the liver in animals by ingestion of alcohol. The lesions commonly associated with alcoholism have not been reproduced in animals. The literature bearing upon this subject may be found in any of the large German textbooks of pathology. It is not necessary to discuss even briefly Stockard's experiments. I was very much struck with the screen which he showed at one of the Medical Society's meetings in this hall. An old buck guinea-pig, fed on alcohol for four years in daily doses, was certainly a fine specimen with a wicked leery glance to his eye. Experiments on animals by Stockard seemed to indicate perfect harmony with those that have been recently compiled as to the effects of alcohol upon procreation; that it may induce abortions and early deaths is evidently correct, but many of those that survive infancy become strong healthy adults. I find that these facts are in perfect accord with human experiments and knowledge, derived not only from sources of our own generation but those of many previous generations. Even a casual consideration of alcohol leads me to believe that if its ingestion had been so injurious as the picture has been painted few probably would be alive at this time, especially those of the white races.

I have hesitated for the reasons given to describe before this audience the abuses of alcohol. Modern opinion is inclined to the belief that the weak and neuropathic individuals of our race are susceptible in a very high degree to the injurious or toxic influences of alcohol even in small doses, and the belief that alcohol is the cause of mental disturbances is largely incorrect. The constitutional inferior is extraordinarily susceptible to alcohol. Too much stress has been laid upon alcohol as a cause of these disturbances. It is not the primary cause of many of the mental diseases to which the human race is heir. Tuberculosis, syphilis, poor sanitation, unsanitary, ill-ventilated and sunless dwellings are a much more potent source of disease than any other factor. Is it strange that people living in many of the congested sections of New York City should have recourse to alcohol? It would lead me too far astray to enter into this subject at length. Poor living conditions only recently have been brought up for consideration in our civic life—largely through the efforts of our able Mayor, and at last a desire is apparent to alter the living conditions of the poor, to give them respectable homes. In cutting out the saloon we have deprived them of their places of amusement and of their liquid bread—the beer of the Germans and the pain liquide of the French—which has such marked nutritive and tonic properties. I believe that less attention to alcohol and more attention to the physical and psychical welfare of the poor would be far better than this one-sided action by probably well-meaning people to abolish the innocent pleasures of a people. It is undoubtedly true that statistically speaking, industrial plants, especially in the early years of prohibition, were greatly benefited by prohibition. I have seen no recent statistics, however, on this subject. Those that I have seen are derived from the earlier years, 1922 to 1924 inclusive. It is well known that in Pennsylvania the miners get their beer, because the owners realize that if the Slavs and Hungarians did not get it there would be a strike, and so they are supplied with beer. Personally, I cannot vouch for this statement but there are a good many

other things in life that one cannot personally verify without a considerable expenditure of time and money.

I would like to see in my own country the same attitude towards life that I have seen in Austria and Germany, especially in Bavaria and the Rhineland, where the people enjoy themselves in the garden or in an innocent inn, partaking of one or two glasses of beer, having an intelligent conversation amongst themselves and listening to good music. No matter what the industrialists say, the human body can never be considered in the light of, let us say, an automobile—that it can run willy or nilly. Even an automobile must be given a chance to rest and have its parts fixed before it is sent on another long run. I do not like the attitude which many of the industrialists have taken, lauding the virtues of prohibition at what I consider the expense of the human body. The human body is the most complex mechanism that one can imagine; its intricacies are being delved into and elucidated day by day and necessarily slowly. No human machine can run efficiently unless it has mental relaxation.

It is interesting to trace the connections and character of the people that are so violently anti-alcoholic. The majority of them are sect people. They are interested in anti-vivisection, anti-tobacco, anti-evolution, restriction of amusements, especially on Sundays. They are all antis except when it comes to prohibition.

Has prohibition been worth while? All law-abiding citizens of whatever class are unanimous that moderation in all things is desirable. The statistics clearly indicate that the Eighteenth Amendment and the Volstead Act have not brought about salutory results. Instead of saloons we have speakeasies. There is little doubt that there are many more speakeasies than there were old-fashioned saloons. The saloons remaining are run as restaurants and in them those known may obtain alcoholic beverages. We read in the papers statements by the drys that it is pleasant to contemplate that the corner saloons have been replaced by flower stores and groceries. The authors of such remarks

cannot be familiar with the actual conditions in a large city. Nobody knows how many flower stores and groceries have back rooms. Prohibition has made those who still want to drink spirits or wine, potential manufacturers. Farmers are not interested in the urban situation; their apples ferment slowly; they mostly vote dry and drink wet.

Are there any facts to substantiate the statements made? They are readily obtainable from many independent sources. For instance, information obtained from the Hospital Information Service Bureau of the United Hospital Fund shows that prohibition has not stopped the ambulance calls for cases of delirium tremens, 472 cases in New York City last year being removed to hospitals and 8,102 cases of acute alcoholism which were attended to. This does not include the ambulance calls classified otherwise, namely, those suffering from falls or other traumatism, gas poisoning, etc., as the result of alcoholism.

Without question the rum death tide rises in a dry era. As I have shown, there is an increase in the death rate from alcohol in the registration area of Continental United States, both in the dry and the wet states.

National prohibition was effective as of midnight January 15, 1920. It has cost the nation since that time nearly 178 million dollars. The Government has lost in national taxes on alcohol approximately a billion dollars a year. A business corporation would ask itself: How comes this to pass? Why this loss to us? Is prohibition an example of ideology run rampant? Every reasonable man would be willing to sacrifice himself in a policy of idealism if it brought commensurate results, but a business man must be shown why he should sustain this loss unnecessarily.

Prohibition has increased drinking not only as to volume, but, as I have attempted to show, has increased the risks attendant upon the drinking of impure alcohol. As quoted above, *"salus populi suprema lex"* is a subject that no nation can afford to disregard. The people in the end must be shown why.

Prohibition as a measure to further the welfare of the people is no recent matter. A number of foreign authors have dealt with prohibition in a sensible manner. I may quote from one of the extreme French opponents of the promiscuous use of alcohol, Dr. E. Monin, author of *"L'Alcoholisme,"* a medico-social study, published in Paris in 1917. The striking statement is made that abstinence is an ideal but one should not demand anything but temperance. This is the formula of a reasonable hygienist. Temperance alone can create a superior and anti-alcoholic class. Only in this way can one conciliate the divergent opinions on alcohol. To attack wine, to declare that everything which contains alcohol is not fitted to be a hygienic beverage, there lies the error, there lies the fanaticism. Everything is a question of moderation. If wine is a product of God, drunkenness is that of the devil. Let us be sober but with sobriety, says Jean-Jacques.

Dr. Monin is the best qualified prohibitionist and moderator that I know. His statements are sane and although somewhat biased, he nowhere prohibits the use of alcohol as a medicine in the form of good wines, etc.

To conclude, a careful consideration of the subject of alcoholism may be said to startle us with the lack of accurate information that we have concerning morbidity and mortality. The statistics presented, drawn from various sources, as to the number of arrests in the pre-prohibition era as compared with the present era, except those of the Moderation League, are mostly laughable. The statistics are unreliable because they are made up by people who have no knowledge of actual police or civic problems. No arrests are made of people found staggering in the streets if they are apparently able to get home without assistance. An extra duty upon the police at best, if they were arrested where could they be taken for the night?

The consumption of impure alcohol with all its deleterious effects is at this time an actual public health menace.

Drinking during prohibition has become a secret vice, with all the terrible consequences which ensue from such an evil. Prohibition, as an amendment to the Constitution and its Volstead Act—what beneficient action has it conferred? An economic issue of unparalleled extent has been created. A bureau of enforcement with a constantly increasing budget has been established. A new incentive to crime has been nurtured followed by an increased number of homicides by enforcement officers as well as bootleggers and hi-jackers. It has brought property and real estate changes of enormous value. Breweries and distilleries with large property and financial interests have been dispossessed. Our mode of living and habits have been changed. We have been transformed into a people eating in cafeterias with bad food at high prices. Demoralization of the spirit of the youth of our country is prevalent. What happens to us elders is of little consequence.

In a lawless country the argument that law enforcement is supreme is subject to doubt. Prohibition enthusiasts forget that the drinking of a glass of beer is not under any circumstances *mala in se* but *mala prohibitta*. Our grandfathers threw the tea into the waters of Boston Harbor. *Qui bono?*

Let me say finally, until all our citizens take a pledge, there is only one remedy and that is absolute and strict enforcement by federal, state and municipal authorities. To function perfectly, the enforcement of the Eighteenth Amendment must prohibit importation, compel the closure of all commercial and private stills and home brews, the elimination of bootlegging, the establishment of a corps of strictly honest prohibition officials, if any such can be recruited in the United States. The reverse of the medallion is that the customs, habits, morals and the religious observances of millions of people are to be altered by some miraculous psychologic transformation, which I have seen, heard or know nothing of. Appeal to common sense and unity of ideals and standards seems to me to be the only effective remedy. In a democratic country, the ballot, after

all, is the determining factor, the solution of a grave public health menace.

Dr. Louis I. Dublin, in an article read at the Forum Session of the American Public Health Association on October 20, 1927, published in full in the American Journal of Public Health and The Nation's Health, January issue of this year, has contributed a very illuminating article upon prohibition and its relation to public health. He has analyzed the figures furnished by the Metropolitan Insurance Company. To quote him very briefly, he states: "That the prohibition period is characterized by sharply declining mortality rates among children and adolescents of both sexes; and that this decline is characteristic of a number of additional age periods among women. The improvement is retarded among young male adults and disappears altogether during the middle years of life in that sex. In fact, the mortality has definitely risen among men after age 35. Altogether we may safely say that over half of the total population has experienced a very favorable mortality during recent years. One might even go a bit further and say that the facts are consistent with an assumption that the conditions of life during the period of the new legislation have been beneficial to this large part of the public. A little arithmetic will show that there has been a saving each year of about 14,500 children under age 5, another 2,000 each year between ages 5 and 10 and another 1,000 between age 10 and 20. This makes a total of approximately 17,500 young lives a year.

"At the children's ages, the greatest improvement in the death rate has taken place from accidents, from diarrheal diseases and from pneumonia. Infectious diseases have likewise declined considerably. Among young women, the improvement we spoke of is traceable somewhat to a decline in tuberculosis. There has also been a sharp decrease in the mortality from puerperal causes. It would appear, therefore, that the improvement is a response, in some measure, to the direct attack made by health and social service agencies both public and private which has been

going on for years against the communicable diseases and against the diarrheal diseases of children. But, in addition, it may be considered a reaction to a rising standard of living, and this is especially evidenced by the lower tuberculosis and the lower pneumonia rates.

"The whole picture is consistent with and may well be expected to have arisen (to an appreciable degree) from better conditions within the home, such as more and better food, better medical service and better housing. It is impossible to measure or to say how far any one factor has operated in the direction of reducing mortality. The increased facilities of public health work and the better conditions within the home have operated together to produce the end result, and it would be entirely unfair to over-emphasize the effect of one of these forces as against the other. In fact, these two activities work best hand in hand and add to each other's effectiveness.

"While we may say that the death rate of children and of young women, that is, those who remain at home for the most part, would probably have gone down without prohibition, it would be too much to assume that the conditions within the home during the prohibition years had not been instrumental in furthering the decline. The conditions of domestic life during the last few years have been such as to add incentive and power to the forces already at work to make for better health and longer life in these divisions of the population."

Dr. Dublin emphasized the improvement in economic conditions and is not willing to accept without qualification the suggestion that "that part of the wages which under the old regime went into the liquor traffic is now largely diverted into channels which mean increased protection and welfare for the family." He states that "this phase of the subject is unfortunately beclouded with much uncertainty," and that "we know very little that is accurate with reference to the amount of alcohol now being consumed, what is being spent for it, and least of all, how

the facts shape up for the various economic levels of the population."

In a heading entitled "Rise in Male Deaths due to Alcoholism," he says: "How then does our assumption with regard to women and children tie up for the facts we have given for the condition among men? Why have the death rates for men increased in view of these favorable changes? In that sex, we find that an improvement in tuberculosis has gone hand in hand with an increase in the mortality from pneumonia, from accidents, from heart disease and kidney disease. During this period, there has been a constant rise in the death rate from alcoholism and from the associated condition of cirrhosis of the liver. Both of these diseases were at a minimum in 1920. They are now at a point almost as high as in the decade prior to prohibition. The picture we have found to exist in the mortality of adult men in the United States is entirely consistent with the observations universally confirmed of a continued widespread indulgence in alcoholic beverages by men. Prohibition has not been particularly effective in that sex and especially has this been true in the cities, and, more particularly, in the eastern states.

"If the saloon has gone and the great body of men no longer spend a great part of their wages on liquor, it is only too clear that what they do drink now, even if in smaller quantities and at a lesser total cost, is of such a deleterious character, as to result in no advantage to their health. The quality of liquor used throughout the country is sufficiently bad to make up for the smaller quantity consumed. The economic gains help us to understand the condition among women and children; the character of the present supply of liquor helps us to understand the lack of improvement which appears in the mortality of men.

"There can be little question as to the unsatisfactory situation now confronting large areas of the country as regards the use of alcohol by men. Beginning with 1920, there has been a continuous and marked rise in the number of deaths resulting from the use of alcohol. In 1920,

the death rate from this condition reached its minimum, namely, 1.3 per 100,000. Every year since then, virtually with no exception, has seen a rise and the rate is now more than three times as high as it was only six years ago.

"The same condition is found to exist among the industrial classes as among those of larger incomes whose insurances are carried in the ordinary departments of the insurance companies. The insurance results are confirmed by the population figures for the several states and this phenomenon is widely observed, larger cities showing more strikingly what can be found in the smaller ones with a little more searching. In Maryland, the alcoholism death rate in 1926 was the highest ever recorded since 1911. In Rhode Island, Michigan and New York, the 1926 rate was the highest with a few exceptions.

"The records of hospitals for the insane tell a similar story. The year 1920 showed the lowest rate for admissions to hospitals for mental disease due to alcoholism. Since that year, the admission rate has increased step by step and last year saw conditions three times as bad as six years ago. It is only too true that in the country over, with very few exceptions, there is a mounting rate from alcoholism and from the associated diseases among the male population.

"This situation is in striking contrast with what has occurred in neighboring Canada. In the Dominion, likewise, several provinces have been experimenting with one form or another of regulatory legislation. But in that country, there is as yet no evidence of any untoward result in the mortality rates for any large group of the population. The experience of the Metropolitan Life Insurance Company in Canada is especially instructive. Among over 1,000,000 policy holders, there have been recorded only 100 deaths from alcoholism and acute alcoholic poisoning during the entire period, 1911 to 1926. On the annual basis, the number of deaths from these causes among Canadian policy holders is so small as to be almost negligible. The death rate from these causes, in fact, is only about a quarter of

what it has been among insured lives in the United States But what is even more interesting is the fact that the deaths from alcoholism have gone down during the last ten years in Canada—a condition very different from that in the United States. In so far as death rates are a reliable indication, the Canadians seem to have succeeded much better than we in their efforts to control the problem of alcohol and of alcoholism."

I know that you will pardon my quoting *in extenso* from Dr. Dublin's article. Dr. Dublin is certainly against the drinking of the highly deleterious stuff that passes for alcoholic beverages these days.

Professor Raymond Pearl of the Johns Hopkins University, Department of Biology, has analyzed the age of the deaths in Johns Hopkins Hospital of over 2,200 persons. In order to show the effect of alcohol on the age in which these persons have died, he has classified them into three groups—the abstainers, the moderate drinkers and the heavy drinkers. His statistics show that the moderate drinkers outlive slightly the group of abstainers, 45.10 to 45.2. The statistics from the alcoholic wards of Bellevue Hospital show that there has been no decrease from deaths due to alcohol since the constitutional prohibition was enforced, namely, at midnight on January 15, 1920, a little over eight years ago.

II.

A STUDY OF THE ALCOHOLIC CONTENT OF AUTOPSY MATERIAL, AND ITS BEARING ON THE CAUSE OF DEATH

ALEXANDER O. GETTLER

Before taking up the question of alcohol, will you pardon me if I diverge a little and take a few minutes in talking about the chemical and toxicological department of the Chief Medical Examiners' Office. Very few people in New York City know that such a department exists; in fact

there are many people in New York who do not even know that a Chief Medical Examiner's office exists. It was only because of supreme effort on the part of Dr. Norris, that New York City consented to have the toxicological laboratory installed. My main reason for talking about this department is because of statements made that so little research work has been published and the material at hand is so large. I will give you a short summary of the work of the Department of Toxicology.

The laboratory is situated at Bellevue Hospital on 29th Street and First Avenue. It takes care of all the chemical and toxicological work of the Medical Examiner's Office from the five boroughs, Manhattan, Brooklyn, Bronx, Queens, Richmond. In this laboratory there are analyzed annually approximately 1500 cadavers. Each cadaver may necessitate the analysis of several organs—the liver, brain, spleen, kidneys, etc. The analysis of one cadaver may sometimes take several days. There are of course, some analyses like alcohol which are completed in a couple of hours. Besides these analyses of cadavers, the Chemical Department does work at the request of the Police Department such as examining blood stains, medicines, liquors, hair, weighing bullets, and other odds and ends. Then I am also called to District Attorney's Offices in all of the five boroughs as a consultant. The District Attorney does not come to my laboratory but I have to go to each respective borough. All this is very time consuming.

I am also called to testify before Grand Jury, Court, or compensation referee. The court work is the least thankful of all. The work is done as scientifically as possible. The results are interpreted in an honest way. At the time of the analysis I do not know whether the defending lawyer or the District Attorney is going to ask me to appear. Results of analyses are filed with the Chief Examiner as soon as completed, and long before the matter goes to court. When the case comes up I am subpœanaed to testify. The opposing lawyer then tries to "show you up" by asking all kinds of tricky questions. I will give you one very short instance.

This was a case of an automobile accident, with ensuing death. I testified that the man was intoxicated at the time of death because of the amount of grain alcohol I found in his brain. The lawyer for the defense then got up and cross-examined me. He picked up a book from his table, opened it, looked at me, and asked, "Do you know Single?"

I looked at him, I did not know what he meant. I thought he had a book written by a man named "Single." So I said, "No, I have never heard of him."

He looked at me and smiled at the jury. He asked me again, "You do not know what Single is?"

Then it occurred to me what he meant. There is present in the brain tissue a substance called Sphingol. This happens to be a chemical substance, a solid which has hydroxyl groups and is chemically classified as one of the substances belonging to the large group known as alcohols. So I said to him, "I think I know what you mean. You mean Sphingol."

He said, "Yes, what is it?"

I said, "It is an alcohol."

"Oh well then, everybody has alcohol in his brain has he not?"

I said, "No. Not grain alcohol."

He looked at the jury and smiled, and said, "That's all." The District Attorney should have cleared up this point. I suppose he did not know enough chemically to do it. Such are the things we are "up against."

You can all see by this short review that the work of the Chemical Department is quite lengthy. Now what is the staff which does this work? We have in the Chemical Department three individuals—myself and two assistants. The total outlay in salaries is $4700 and dividing that by fifteen hundred cadavers it means that an analysis of a cadaver costs New York City just three dollars. The Police Department work, the District Attorney Office work, the court work is thrown in gratis.

If a person knows the conditions above referred to, I do not think he will ask, "Why has not the Department done more research work, having such wonderful material?" We have wonderful material but we have not got the time. Our time is taken up too much by routine work, and even so we have been able thus far to work up chemically and publish about twenty-four papers on different subjects. One of these papers is on alcohol and is the one I will bring to your attention to-night before I talk about these samples of liquor which have killed people.

The work which I want to talk about first, is a method by which we can tell by analyzing the brain whether a man or woman was intoxicated at the time of death. Intoxication, of course, may be contributory to automobile accidents, to vocational accidents, etc. One important question that has always been put to me when in court or before the compensation referee, was this man intoxicated? That question could never be answered definitely because, first, we did not have methods that were tried out well enough so that we were sure they were accurate methods for determining alcohol in tissues; and secondly, we did not know whether the alcoholic content of organs was any index to intoxication. These two points we have solved.

First one must bear in mind that this method must detect and quantitatively determine extremely small amounts of alcohol. Amounts as small as four drops of alcohol in the entire brain (0.01%). Then this small amount of alcohol is intermixed with a large amount of body tissue.

We first tried out various methods found in the literature but had to discard one after the other. I will simply run over them quickly. We tried first the method of Nicloux, titrating the alcohol in the brain distillate by a dichromate sulphuric acid mixture. This did not work because there are other volatile substances in the brain tissue which react with chromicsulphuric acid. We tried oxidizing to aldehyd and determining it. Then we tried the methods which are based upon the formation of iodine

compounds (ethyl iodid). We found these methods useless for small traces of alcohol.

We tried to determine it by specific gravity or by refractive index. These also had to be discarded. The methods which seemed to give us best results were those in which the alcohol was oxidized to acetic acid and then the acetic acid titrated with very weak standard alkali solutions and upon this principle we finally developed a method that is quantitative.

At first when this method was tried, we obtained very inconsistent results. Amounts of reagents to be used, and optimum conditions for the best recovery were finally worked out. Under these conditions we were always able to recover between 83% and 86% of the alcohol added. The average is 84.5%. By multiplying this by 1.18 we obtain the total alcohol present.

It might seem that a difference between 83% and 86% is very large. But when you consider that the total amount of alcohol in a brain is only in the neighborhood of 0.35% the difference between 83% and 86% (error ±1.5%) is not much. It simply means that if a brain contains 0.35% alcohol, I will obtain by this method a result somewhere between 0.345% and 0.355%.

The method developed is as follows: Five hundred grams of brain material are ground up. Enough water added to make mixture fluid, acidified with tartaric acid, little white oil added to prevent frothing, and then distilled with steam. Eight hundred c.c. of distillate are collected. To 300 c.c. of this distillate are added 20 grams of potassium dichromate and 40 grams of sulphuric acid. The mixture is distilled at a slow rate until 250 c.c. are obtained. This distillate is titrated either with 1/50 normal or 1/100 normal alkali. From the titration figure the alcoholic content is calculated.

Now as to the question, is alcohol in the tissues an index of intoxication? If we find alcohol, what does it mean? Several points had to be cleared up. First, what organ or

tissue is best for analysis in order to determine intoxication. We have tried brain tissue, liver, lung, kidney, and we found that the brain gives us the best index of intoxication, which of course one would expect. Still it had to be proven as a fact.

The next point, is alcohol normally present in the brain? That is in people who imbibe no alcohol. Is there ever any alcohol present in the brain due to normal metabolic processes? There is a great array of literature on this subject. Among the various workers in this line Ford, Nicloux, Landsberg, Maignon, Pringsheim and Schweisheimer have reported the presence of traces of alcohol in human brains, although the individuals had not consumed any. Most of these workers, however, did not use human brains, they used animal tissue and human blood. They found that the amount of alcohol present ranges from .001% to .083%, very small traces.

Another series of workers trying to determine whether alcohol is present normally or not, not trying quantitative methods, but just qualitatively, such men as Bechamp, Rajewsky, Vitali, Nicloux, Stocklasa, Arnheim, Rosenbaum and Umber came to different conclusions. Some of this group stated that alcohol is present normally; others of this group that alcohol was not present normally. The reason for their opposite conclusion is mainly due to the fact that the tests which they used were not specific for alcohol. They used tests such as Moore's, Schiff's, Nessler's, Lieben's, which are not specific for alcohol. To date therefore it has not been proven whether alcohol is present or not as a normal constituent of brain tissue. In applying our method to human brain tissue (brain of people who had consumed no alcohol) we found that each one reacted slightly positive to our quantitative test. The amount is very small, about 7 mg. in 1000 grams of tissue.

Let me outline the chemistry of this test. Alcohol is C_2H_6O, and when oxidized it is converted into acetic acid. This latter can then be titrated, and from the titration

figure the alcohol calculated. When normal (non-alcoholic) brains are distilled and oxidized, a small amount of acid is also produced. Whether this acidity was produced from ethyl alcohol normally present or some other volatile substances we can not say. We have proven however that if it is alcohol, the amount present normally is always less than 25 mg. per kilo of brain. I might add that 25 milligrams in a kilo of brain means about one half drop of alcohol in the entire brain. This is the limit of the alcoholic content of a person who never takes alcohol, provided it is alcohol, which has not been definitely proven.

I might say at this stage that I am now having under investigation this very point, whether the substance present in brain, volatile and oxidizable to acid is really alcohol.

Now we come to the alcoholic content of the brain of partakers. When this paper was written we had examined over 6,000 human brains of various alcoholic contents. The results obtained were compared with the histories of the cases in question. Of course when it comes to histories, one well knows that some of them must be taken with a grain of salt. We have tried to pick out those cases in which the histories were pretty definite and trustworthy. In many cases hospital records were used.

In the chart, the cases with an asterisk were habitual users of alcohol. The others were occasional drinkers.

Case 6 was one of intoxication, and in the hospital three and a half hours, the alcoholic content .315%. Notice the great increase over the normal. The normal was .0015. There is no question as to the presence of alcohol. The normal value is in the third decimal place.

With the plus signs we designate the alcoholic content for the Police Department and for the layman because the actual figures mean little to them.

Chart I.

Results of Estimation of Ethyl Alcohol in Brain Tissue

Case	History	Cause of Death	Gm. of Ethyl Alcohol per Kilogrom of Brain	Percentage of Alcohol in Brain	Arbitrary Classification
1	In hospital 12 days; no alcohol given	Heart	0.0062	0.0006	Absent
2	In hospital 18 days; no alcohol given	Mercury poisoning	0.0195	0.0019	Absent
3	In hospital 8 days; no alcohol given	Nephritis	0.0156	0.0015	Absent
4	In hospital 24 days; no alcohol given	Heart	0.0095	0.0009	Absent
5	In hospital 15 days; no alcohol given	Pernicious anemia	0.0116	0.0011	Absent
6*	Intoxicated; in hospital 3½ hours	Alcoholism	3.150	0.315	+++
7	Intoxicated; in hospital 2 hours	Alcoholism	5.780	0.578	++++
8*	Found dead; seen intoxicated ½ hour before	Alcoholism	2.980	0.298	+++
9	In hospital 8 hours; not intoxicated, but aggressive	Alcoholism	1.760	0.176	++
10	In hospital 3 hours; intoxicated	Alcoholism	2.890	0.289	+++
11	In hospital 4 hours; not intoxicated, but aggressive	Shot	2.040	0.204	++
12	Intoxicated; in hospital 2 hours	Fractured skull	3.540	0.354	+++
13	Intoxicated when fracture received; lived 14 hours	Fractured skull	0.550	0.055	+
14	Same as in case 13; lived 18 hours	Fractured skull	0.730	0.073	+
15	In hospital 5 hours; intoxicated	Alcoholism	3.010	0.301	+++
16	Not intoxicated; in hospital 8 hours	Fractured skull	0.110	0.011	Trace
17	Intoxicated; in hospital 5 hours	Fractured skull	3.660	0.366	+++
18*	Intoxicated; in hospital 1 hour	Fractured skull	2.930	0.293	+++
19	In hospital 1½ hours; not intoxicated, but carefree	Fractured skull	2.250	0.225	++
20*	In hospital 3 hours; intoxicated	Alcoholism	5.450	0.545	++++
21	Intoxicated 30 min. before death	Alcoholism	3.800	0.38	+++
22*	Intoxicated 45 min. before death	Hit by train	4.200	0.42	++++
23	Brought to hospital in coma	Alcoholism	2.690	0.269	+++
24*	Was drinking excessively to the end	Alcoholism	5.050	0.505	++++
25*	Intoxicated 25 min. before death	Hit by auto	3.420	0.342	+++
26*	Found dead; intoxicated 2 hours before	Alcoholism	5.250	0.525	++++
27	Not intoxicated	Heart	0.560	0.056	+
28	Not intoxicated	Gunshot	0.090	0.009	Trace
29	Not intoxicated; one drink 4 hours previous	Heart	0.410	0.041	+
30	Intoxicated 2 hours before death	Alcoholism	3.850	0.385	+++
31*	Not intoxicated; in hospital 6½ hours	Alcoholism	0.750	0.075	+
32	Not intoxicated but carefree	Stabbed	1.590	0.159	++

* Indicates habitués, others only occasional drinkers.

Case 7 was not a habitual drunkard but was intoxicated and two hours in the hospital. Case 8 was a habitual drunkard seen one-half hour before death in an intoxicated condition.

Glancing through the list we find that three pluses and four pluses are intoxicated. Among the one and two pluses we have thus far not been able to find one where the history showed us that intoxication was present.

This chart shows our classification of the cases.

CHART II.

CLASSIFICATION OF ALCOHOL CASES

Classification	Gm. of Alcohol per Kilogram of Brain	Percentage of Alcohol in Brain	Physiologic Effect
Trace	0.050 - 0.200	0.005 - 0.02	Normal
+	0.200 - 1.000	0.02 - 0.10	Normal
++	1.000 - 2.500	0.10 - 0.25	Loss of sense of care; aggressive
+++	2.500 - 4.000	0.25 - 0.40	Loss of equilibrium; intoxicated
++++	4.000 - 6.000	0.40 - 0.60	Unbalanced; intoxicated

Now as to affect. With a trace of alcohol the person looks normal, walks around normally and acts normal. Therefore one plus cases look normal. Two plus cases do not look intoxicated. Some have however lost their sense of care. They are a little aggressive—the modern hooch especially makes one aggressive. In the three plus cases there was a loss of equilibrium (intoxication) and the four plus cases were in the same condition only they were almost helpless. They were so badly affected that they could hardly walk. So by the amount of alcohol in the brain we can now say that we have an index for telling whether a person is intoxicated or not.

Against this many people bring forth the same question that is repeatedly asked of me in court, "Well, doctor, isn't it a fact that I can give the same amount of alcohol to two people, and one may become intoxicated and the other not?"

My answer to that is: We are not analyzing what the man gets to drink. We are not analyzing what the man

has in his stomach. We are not analyzing what the man has in his intestines. We are analyzing for the alcoholic content of the brain.

There is a difference between how much alcohol is in the brain, and how much did he drink, or how much is in his stomach. The amount in his stomach does not affect the brain. The alcohol in the intestines does not affect the brain. Once it gets to the brain, it has an effect and that effect is proportionate to the amount present.

There is experimental evidence in the literature on that same point. Rosenfield in 1901, working with animals, came to the conclusion that the reason habitués can stand more alcoholic beverage is because they have a more rapid oxidative power; that is, their organs can oxidize, burn up alcohol quickly and if they do that, then the alcohol does not accumulate in the brain as it does in other people, so it is a question of oxidation.

Reid Hunt in 1907 came to the same conclusion that tolerance is simply a matter of oxidation. If an animal has a high oxidative power toward alcohol he can stand more. If he has a lower one he can not stand as much.

Pringsheim in 1908 came to the same conclusion. He found that habitués burn alcohol in two-thirds the time. Further, he found that habitués burn up alcohol in all of the organs, not only in the liver. In occasional drinkers the alcohol is oxidized mostly in the liver, but in habitués all the organs have attained the property of oxidizing alcohol. He concludes his paper with the thought that tolerance is due only to oxidation.

Schweisheimer in 1912 corroborated Pringsheim's theory that tolerance is due to more rapid oxidation and found no evidence for increased resistance by the cells.

The foremost workers in this field, all come to the same conclusion that habitués can tolerate more because they have a greater oxidative power toward alcohol.

Our work consisted in taking alcoholics with sudden death, and having a definite history, and analyzing the brain. As far as we have gone, our cases seem to show exactly the same things as these men found in animal experimentation. So much for the alcoholic content of brains.

Now a few words on alcohol deaths. Alcohol deaths in New York City seem on the increase. Dr. Norris has outlined to you not only New York City, but the increase in other states. Now the question of course arises, what is the cause? First, more general drinking. I am talking, of course, mainly about New York City because that is the city I am familiar with. There is more general drinking to-day. It is heroic to have the hip pocket flask not only for grown-ups but youths in their teens; boys and girls have drinking parties. There are many more speakeasies to-day than there were saloons. In going around it its surprising to see cigar stores, candy stores, drug stores, grocery stores, all have as a sideline the whiskey trade. In one block near the hospital, as far as I have been able to estimate, there are about fifteen speakeasies and I have not been able to spot them all. Bootlegging, furthermore, is a very profitable vocation. Many are turning to bootlegging now.

The second cause is the kind of material. Of the whiskeys that come to my attention I would say that 95% of them are really unfit to drink. Some are denatured by the various denaturants which the government puts into them. That group of denaturants is very large. I will just mention a few of them. I found among the denaturants wood alcohol, fusel oil, formaldehyd, phenol, aniline, benzine, nitro-benzine, ether, quinine, nicotine, mercury, bichlorid, diethylphthalate.

Some of the liquors obtained are denatured, some of them are simply freshly distilled mash, that means freshly fermented and distilled whiskeys, raw alcohol; and still others are simply mixtures of alcohol and water and sugar and caramel and a little bead oil and whatever else the bootlegger may have he chucks in, puts them into a barrel

and shakes up the barrel. I have been told lately by one of my assistants that they even buy old whiskey barrels, and cut up the barrel, and extract the wood of the barrel and mix that extract into their whiskey. That is a resumé of the kind of liquors which are being sold.

I have brought these samples in case some are interested to see them. These samples I gathered from various cases submitted to me. I picked out colorless glass bottles of the same kind. I really do not think I should have done that. I should have brought up the various kinds of bottles as we get them but the reason I brought these is because they are transparent glass and you can see the nature and color of their contents. All these that you see here are either denatured or raw fresh alcohol and most of these have produced death.

Of course some denaturants are more poisonous than others. The most poisonous of all is wood alcohol. After that pyridine and fusel oil. Some of the others are not so very poisonous and one drink will not kill a person but if he keeps on drinking the same denatured material it is bound to have an effect.

As to the poisonous effect of raw alcohol, fresh mash whiskey, which has not aged, I can say very little because I really think very little is known. But what we know is perhaps this: Fresh whiskey even made in the regular old fashioned way but freshly distilled contains besides ethyl alcohol, a large number of other substances in small traces. Among the alcohols it contains propyl alcohol, butyl alcohol, amyl alcohol, glycerine. It also contains traces of acid such as propionic acid, butyric acid, valeric acid, capric, succinic. It also contains aldehydes. The main part of freshly distilled whiskeys is ethyl alcohol. These other substances are present in very small traces.

What effect these above mentioned substances have upon the organism is also not well known. It seems to be a continual irritation on all the cells and tissues.

On aging, these substances combine with each other to form esters. These esters are more pleasing in taste and much less toxic and irritating.

The aging, therefore, does away with the irritating effect, and produces a pleasant flavor. The consensus of opinion seems to be that aging is simply the neutralization of various substances in ordinary fermented material.

I have also brought up here two of the latest denaturants which the Government uses and perhaps some of you would like to see them.

In conclusion, the fatalities due to alcohol I would say are due first to alcohol excess; second, to denatured, poisoned liquor; third, to raw fresh whiskey and this raw fresh whiskey seems also, as I said before, to produce an aggressiveness of the bravado type. It is not so far fetched to say that perhaps many of these hold-up individuals get a lot of their psychical effect from this kind of alcohol. Of course there are other reasons also which do not come into this subject but I think it is not far fetched to say that that is one reason.

The complete prohibiting of alcoholic beverages has also led to a much greater use of drugs.

Beyond this my experience has been such as to agree with the statements in the book which I have read lately by Raymond Pearl of Johns Hopkins, published in 1926, where he has found from a large number of statistics that moderate drinking of bonafide material lowers the mortality and there is a greater expectation of life. Experiments on animals all practically seem to show beneficial effects.

Hence in conclusion I might say it would be far better to make proper use but avoid abuse.

Discussion

Haven Emerson: Dr. Lambert, members of the Academy, ladies and gentlemen: No one need feel discouraged with the progress in city government who has lived through the change from coroner to medical examiner. The lack of pathological knowledge and common honesty, characteristic of the system under elected coroners, has been supplanted by the impersonal and effective use of the sciences of pathology and toxicology for public service and the administration of justice.

Those who have been fortunate enough to stand at the table when Dr. Norris was conducting the autopsy realize his rare capacities in the field of forensic medicine. He is not excelled in this country as a pathologist in public office. It is, therefore, that I accept without question the evidence Dr. Norris has presented from the field of pathology to-night.

His opinions, based upon experience in the fields of vital statistics and sociology, are of much the same value as would be those of statisticians on matters of pathology.

It is a pity that Starling has been quoted only from his emotional post-prohibition writings which in many points reverse the sound physiological opinions he previously held and published. The work by Starling, Mott and Pearl has failed of acceptance physiologically and statistically because of its contradictions and incompletenesses of statement. Furthermore the much quoted statements of Pearl on the lower mortality rates of moderate drinkers as compared with abstainers must be considered unsound in view of the scathing destructive analysis of his method and argument by that master statistician, Professor Harold Westergaard of Copenhagen.

First in importance among the scientific discussions of alcohol and public health are those by Dr. John Billings, Chittenden, Bowditch, Atwater and others in this country in 1897-1903, and the report in England in 1918 by a committee including Newman, Cusny, Sherrington and Mott.

The latter group, with the sincerity of men acting for their country at the time of its greatest struggle for survival, came to conclusions which are worth quoting for their brevity as well as for their authority.

"The main action of alcohol apart from the effect of its continued use is confined to the nervous system. Alcohol is a narcotic rather than a stimulant in action. Its habitual use as an aid to work is psychologically unsound. Its nutritional value is strictly limited by its drug and toxic effects.

"The ordinary use of alcohol should not only be moderate, but should also be limited to consumption of beverages of adequate dilution taken at sufficient periods of time to prevent deleterious action to tissue."

If anybody in the face of that extremely restrained statement can claim that the use of alcohol can be accepted as racially or individually advantageous, they have an optimism and imagination which is inconsistent with the facts. Anyone who thinks he can produce the superman of the future may of course be tempted to try for four or five generations so to alcoholize the parents and offspring that there may be a duplicate of those guinea-pigs, vouched for by Stockard, which are larger than the great, great grandparents of the first guinea-pig of the series. As for any attempt by any people to improve themselves racially or individually by the use of alcohol, that is still among the sociological experiments of the future.

The experience of Denmark has been of much importance, as reported by Hindhede, because of the homogeneity of its population, the high level of literacy among the people and their universal and very democratic participation in the determination of their social problems. The interesting fact that comes out of their experience in the last thirty years is that the death rate of men at all ages from twenty up to sixty has fallen so that it almost reaches that of women. In practically all countries there is a discrepancy of from 10 per cent. to 40 per cent. between the death rates of men and the death rates of women

to the disadvantage of men, partly because of occupation and partly because of various other factors including their greater use of alcohol. Wherever beverage alcohol is reduced in amount and practically in proportion to the reduction of its use, there is a closer approximation of the death rate of men to that of women. There is no country in which social practice partly through legislation, partly through economic pressure, but chiefly through very intensive education in the problems of nutrition and of alcohol, has caused such a per capita reduction in the use of alcoholic beverages, by what one might almost call voluntary methods among educated people, as there has been in Denmark in the past twenty years. With this, there has been a nearer approach of the male death rate to the female death rate than has been found in any other country.

We haven't any unequivocal answer to the question whether our attempt at Federal prohibition has benefited public health or not because we have never kept records of a kind by which an answer might be given. Dr. Dublin's extremely conservative statement is the nearest that can be obtained from statistical sources in the United States at present. And evidence of another kind, which is quite indirect, comes through social practice and includes factors which are also imponderable and likely to be abused when the statistical method is applied.

I think Dr. Norris has made a point which would be accepted by all sanitarians, that the condition of housing is an important determining factor upon the state of health of a community, greater probably than alcohol has been, certainly for the majority of the people concerned. But it must be admitted that the factor which is likely to improve housing is the improved economic condition of the wage earner and I believe there is a strongly held opinion among employers of labor and among those who have records of wage earners, that the housing, clothing and feeding of the wage earning class has been improved during the last eight years, out of proportion to the increase in the absolute and relative value of wages. In other words the

outlawing of the beverage alcohol business has meant larger expenditures by the wage earner for the comfort and sanitary safety of his home and family.

The fact that there has been loss of federal tax income of one billion dollars must be offset against the fact that prior to prohibition we had an annual popular expenditure of two and a half billion dollars for liquor in so-called legitimate business, according to the Internal Revenue Bureau records.

When Dr. Norris says that the effects of prohibition have been wholly deplorable he ignores the experience of large sections of the country outside of New York City and state. If the death rates are studied for the various states and cities or regions of the country according to the attitude of the people towards local prohibition, before and after 1920, striking differences appear, indicating the great benefits which have occurred where the people are mainly in sympathy with the present law, and the lack of improvement in such cities as New York where public officers and the public press flaunt their disregard and openly encourage violation of the law.

I won't attempt to quote the considerable mass of figures which are easily available to anyone, but I would merely ask you to consider this series of particularly reliable ones prepared from the experience of the New York Life Insurance Company by the hand of Arthur Hunter, an actuary of international renown. The rates given include deaths from alcoholism, and accidental deaths from wood and denatured alcohol poisoning combined. The death rate per hundred thousand of policyholders in the period 1900 to 1906 varied from 4.0 to 4.2. In the period from 1914 to 1916 they varied from 4.0 per hundred thousand to 5.1. In the years 1924 to 1926 they varied from 1.6 to 1.7.

A reduction in death rates from alcoholism to about one-third of the pre-prohibition death rate from alcoholism can be found in most of the reliable statistics of this country wherever there has been pre-prohibition opinion favorable to limitation in the commercial traffic in beverage

alcohol. And when we say, as is true, that the death rate from cirrhosis of the liver or from alcoholism has increased 200 per cent. since 1920 and sometimes 150 per cent. in a year for two years running, in some places, we fail to speak honestly. Up to the present time there are few large communities in the United States in which the death rate from alcoholism has risen to the rate that prevailed continuously prior to prohibition, and there are various communities in which the rise in this death rate which followed the continuous failure to enforce prohibition has been followed by a subsequent fall, *viz.,* Detroit, 1927.

The death rate from alcoholism in New York City for the first six months of 1927 was lower than for the first six months of the previous year. We note a fairly uniform occurrence in all types of city, that is the sudden drop in deaths due to alcoholism in 1920-21, the rise over a period of years, which has been large or small, slow or fast according to the temper and interest of the community in the subject, then a peak which has not reached the level of pre-prohibition alcoholism, and then a beginning decline in the rate which is likely to continue in proportion to social and political action on the matter, and the effectiveness of education as to the physiological effects of alcohol.

But to say that there has been a wholesale failure of prohibition, on the basis of vital statistics is neither honest nor correct. You cannot draw conclusions from the experience of the United States as a unit. It is not safe to deal with all the various areas of the country as if they were of homogeneous population groups. You must consider your vital statistics with the same discretion you would use if you were discussing tuberculosis, Bright's disease, or heart failure, and that is to analyze them by age, sex, race, economic state, area, time of year, and conditions of employment, etc. And when such studies are made, it is perfectly evident that there has been wide difference of experience in different parts of the country just as we see variations in the use of alcohol socially. I believe Dr. Norris would do well to consider some other

evidence obtainable from official records, including those of the Census Bureau, before repeating the statement that the effects of the prohibition amendment from the public health point of view have been wholly deplorable.

As Commissioner of Health I was responsible for deciding upon the material on which the Health Department carried on an educational campaign against the use of alcohol as a cause of a considerable number of preventable deaths. Alcohol still causes preventable deaths. It is the business of the Health Department to take cognizance of and report annually upon all causes of preventable deaths as required by the charter of the City of New York. In February, 1916, I declared publicly what was at that time the attitude of the Board of Health, that it would take no interest in, and take no part in any effort to modify the social habits of individuals by legislation, and I feel just as strongly now as I did then, that the only way of making a physiological truth effective is by education, not by legislation. No hygienic measure is likely to be effective until it is understood and accepted by the people.

Legislation which interferes with the freedom and discretion of the physician in the use of any drug or poison he prefers in the care of persons coming to him seeking relief from pain and suffering is bad legislation. If physicians want to use alcohol medicinally more and more, instead of less and less, as the teachers of pharmocology in our medical schools are advising them to, they should not be interfered with by legislatures. But when it comes to a presumption that the Teutonic Elysium which Dr. Norris has presented to us is ever likely to return in the United States, I think he is optimistic to a degree. The pictured paradise of the saloon that Dr. Norris has presented to us will be, I believe, resisted by all persons who are, let us say, above the age of thirty, and have lived with or near saloons in this city or other parts of the United States. To consider it as a social ideal to have a liquor saloon because somebody, somewhere, found in the saloon something that

he called a home or center for social converse, is to my mind a fantastic reason for community atavism.

There is no longer, in most parts of this country, any excuse for what is called misery drinking. We recognize now that if social and employment conditions are so bad that men and women of the family have to resort to liquor to escape from the intolerable conditions of their living, it is our business to see that those conditions are fundamentally corrected instead of narcotizing ourselves into a condition of social complacency, and continuing the victims of an unwise and unjust human relationship.

No discussion of alcoholism or the effects of prohibition can be intelligently carried on unless we keep strictly to the facts. While the human pathology of alcoholism as presented by Dr. Norris will be widely accepted, discussion of the social effects of alcohol and its control calls for a more objective and less emotional approach than has been offered this evening.

PRESIDENT LAMBERT: I should like to make a statement for the Academy of Medicine and say that it is not necessary for the members of this Academy to agree with any speaker that speaks on this platform; that personally although I am representing the Academy, the Academy may differ absolutely with the remarks made by any speaker, yet the Academy will stand for his right to express his opinion here quite freely.

ABSTRACTS OF PAPERS DELIVERED AT SECTION MEETINGS

Section of Medicine, April 17, 1928

MEDICINE IN INDUSTRY*

E. H. L. Corwin

Realizing the economic value of health and mindful of the well-being of their workers, many of the large industrial and mercantile establishments have organized medical departments in their plants. The character and extent of these medical services vary from emergency aid to the complete care of the worker and his family in illness. A large contingent of competent physicians, nurses and auxiliary staffs is being employed to carry on this work and the services rendered are of indubitable value.

The question is often raised as to the extent to which industry should attempt to provide diagnostic service and medical or surgical treatment, particularly in communities which are adequately supplied with medical resources. It was with this in mind that the following brief survey of the character and extent of medical service in industry was prepared. It is based on a study of the available data published in the medical and social service press and describes briefly under various captions what is being done and how the work is organized, thus offering a means of orientation in this large and complex field.

Historical

In this country, medical service in industry had its beginning about two decades ago. It consisted at first in emergency treatment of industrial accidents. Skilled first aid and subsequent supervision of treatment not only prevented infections and complications but reduced the period of disability.

*From a study made for the Committee on Public Health Relations.

With the advent of workmen's compensation laws, which placed upon the employer the responsibility for safeguarding the employee against accident and for providing of monetary relief for disability incurred in or arising out of employment, medical service in industry was given further impetus.

It was, however, during the period of the war that the importance of medical attention to the health of the worker became fully recognized. It has been shown that by reducing economic waste traceable to avoidable occupational hazards, to unfavorable working conditions, fatigue, ill health and other similar factors, medical service in industry helps the individual workman to deliver his output with less effort and greater efficiency. The employer has learned to recognize that the efforts of industrial physicians are economically profitable in that they conserve energy and reduce labor turnover.

Economic considerations, however, are not solely responsible for the growth of the movement. These may be paramount but it is also true that many employers are moved by humanitarian motives and in providing medical service for their employees, have sought to overcome some of the barriers between employer and employee which the increasing size of industrial organizations has made inevitable. The provision of medical service has become a means of expressing the friendly interest of the employer in the employee's general welfare.

One of the main purposes of providing treatment of employees by the companies is to reduce the loss of time due to illness. Experience has taught them that this can be attained by prompt treatment of minor ailments. Absenteeism in industry is a serious matter both for the employer and the employee.

Prevalence of Illness

It has been estimated that the 42,000,000 men and women gainfully employed in the United States lose annually

from illness disabilities, including non-industrial accidents, a total of 350,000,000 days.[1] The economic loss from preventable disease and death is calculated as $1,800,000,000 among those gainfully employed and it is estimated that this loss could be reduced and leave a balance over and above the cost of prevention of at least $1,000,000,000.[1] What can be effected has been shown, for instance, by Dr. John A. Turner, at the Laidlaw Works of the Worthington Pump and Machinery Corporation, of Cincinnati, Ohio.[2] The records of the medical department of the plant show that the average loss of time per workman, from industrial injuries was 2.1 days in 1920; it fell to 1 day in 1925. Industrial diseases were practically eliminated and the loss of time from non-industrial illness was reduced from 8 days in 1920 to 4.4 days in 1926. In 1926 there were 22.4 per cent. more requests for treatment than in 1925, yet the time lost was 26 per cent. less than during 1925.

In both industrial and mercantile establishments respiratory diseases are the main causes of absenteeism from work. In a recent study[3] of the health of office workers in the Home Office of the Metropolitan Life Insurance Co. it was ascertained that over 38 per cent. of the illnesses causing absence, among males and females combined, were due to respiratory diseases (6.4 per cent. due to colds); 27 per cent. of illness was caused by diseases of the digestive tract. Over 11 per cent. of the causes among women were due to dysmenorrhea.

Recently the United States Public Health Service published an interesting study[4] on "The importance of respiratory disease as the cause of disability among industrial workers." Included in the respiratory diseases are influenza and grippe, tuberculosis of the lungs, diseases of the pharyx and tonsils, colds and other diseases of the nasal fossae.

A ten year record of the Edison Electric Illuminating Company of Boston showed that 54 per cent. of absences due to illness among the employees of the company was

caused by respiratory diseases. While the average number of days lost on account of sickness among male employees of that company was 6.92 per man per annum, 3.23 days of disability were due to respiratory diseases—almost half.

The differences in the rate of respiratory illness in different establishments and in different communities due, no doubt, to the character of the industry and the environment of the establishments, are quite striking. In one establishment the incidence based on several years' experience was 17 cases per 1,000 men per annum. In the establishment having the highest respiratory rate, there were 85 cases per year per 1,000 men. In other words, there were five times as many cases of respiratory diseases causing disability for a period longer than one week per 1,000 men in the establishment having the highest respiratory incidence as in the plant showing the lowest. The prevalence of ill health is measured not only by the number of days of absence from work, but also by calls for medical attention at the dispensary. The dispensary experience of one of the concerns for which statistics are available may be of interest. The statistics given refer to a year's experience of the medical department at the Montgomery, Ward and Company mail order firm. The following tabulation showing the services rendered and the monthly averages are significant as indicative of the nature and extent of illness among this group of employees numbering about 1000 individuals. [5]

Services given for	No. of new cases	Monthly average
Colds	644	53.7
Headache	397	33.1
Dysmenorrhea	343	28.6
Gastric intestinal complaints	311	25.9
Pharyngitis and tonsilitis	212	17.7
Skin lesions	239	20.7
Eye and ear	183	15.3
Teeth	103	8.6
Lacerations on hand and finger	331	27.6
Strain and sprains	101	8.4
All other accidents	251	20.9
Minor operations	36	3.0

The experience of the Metropolitan Life Insurance Company with the office clerks at their Home Office has been published recently. The clinic maintained at the office is attended by males and females in proportions closely approximating their respective numbers in the organization. Between 85 per cent. to 90 per cent. of all persons in employment use the clinic each year, and the proportionate distribution of the various maladies remains practically unchanged year after year.

Extent of Medical Service in Industry

The findings of a recent survey made by the U. S. Bureau of Labor Statistics [6] of about 450 industries indicate the enormous strides that have been made in the last decade. In 1916-17 of 375 establishments reporting, only 171 employed doctors and 181 had trained nurses, whereas in 1926 out of 373 establishmnets reporting, 311 employed either full time or part time doctors and 30 had doctors on call, while 332 of the companies employed trained nurses. The improvement in equipment and facilities is shown by the fact that in 1916, 110 of the 375 plants had first aid equipment consisting of only first aid cabinets and sometimes cots, stretchers and pulmotors, while in 1926 of the 375 plants, 373 had one or more treatment rooms and only 34 a limited first aid equipment.

While in 1916 only 19 of the firms under consideration employed full time or part time dentists, and only 5 employed full time or part time oculists, in 1926, 83 of the companies furnished dental service and 32 employed oculists. At present, specialists in diseases of the ear, nose and throat and more lately, psychiatrists, are reported as being employed by factories and stores.

A further idea of the extent [7] to which medical work is being carried on in industry may be gleaned from the statistics published by the National Industrial Conference Board in 1926. Of the 468 plants studied by the Board, approximately 995,777 persons were employed. In the

course of a year, the medical departments in these establishments took care of 1,596,160 injuries, made 3,380,503 re-dressings, handled 1,789,253 medical cases, 85,404 dental cases, and in addition, made 631,239 physical examinations.

The personnel engaged in 499 industrial plants numbered in the aggregate 1,389 physicians, 265 of whom were employed full time, 355 part time, and 769 on call; 91 dentists, 966 nurses, 254 technicians and 360 clerical assistants. The total expenditure for maintenance of staff and support of the medical work in 477 of these plants was $5,306,132 per annum.

Activities of Medical Departments

The development of the Medical Department in a given industry is dependent largely upon the size and character of the industrial establishment and the industrial hazards of the particular industry. The most complete and highly organized medical service is found usually in large scale enterprises with numerous employees and where the risk element is considerable.

The relative emphasis placed on the various phases of the work likewise depends on conditions, such as the nature and size of the industry, and the special opportunities for service under particular circumstances.

In general, the activities of the more highly organized medical departments in industrial plants may be divided into four main divisions:

1. The Preventive
2. The Diagnostic
3. The Curative, and
4. The so-called Extra-medical activities.

1. Preventive

Under the term "preventive" are classified a great many of the important activities.

a.) *Physical examination of applicants for employment and of workers returning to employment after illness.*

The purpose of this examination is to bar from employment such persons as may be suffering from communicable diseases and who may therefore, be a menace to fellow workmen; it serves also to prevent the applicant from entering upon work which would be injurious for him because of some particular physical condition.

b.) *Periodic re-examinations of workers in hazardous employments.*

This is especially important in industries where the employees are subjected to the risks of handling materials known to cause occupational diseases, such as dusts or chemicals, like benzol, aniline and its derivatives, phenol, picric acid, cutting oils, manganese, cadmium and the like. The industrial physician must be continually on the alert to detect early symptoms in order to prevent the development of diseases that arise from poisoning by these substances. In properly equipped plants where the workers are subjected to the hazards attendant upon handling such materials, provision is often made for routine re-examination at intervals, including the necessary laboratory tests.

c.) *Periodic health examinations.*

This practice is carried on at given intervals in certain plants for the purpose of detecting incipient disease. Following the examination, treatment is advised to prevent, if possible, any further development of the pathological conditions found.

d.) *Re-examination of employees suffering from physical defects which require follow-up.*

Sometimes an employee is taken on and placed in a job which may become prejudicial to his health or safety, if certain conditions found upon physical examination are not remedied. Such employees are kept under surveillance and re-examined at intervals. If necessary, they are placed at other employment either temporarily or permanently if their condition at any time should require it.

The taking on of workmen with physical defects is inevitable and it is the responsibility of the industrial physician to place them at tasks which they may perform with relative safety to themselves and others.

e.) *Placing of physically defective workmen.*

In some large plants, places are found for a limited number of defective workers, and in some instances even totally blind, or workers with missing arms or legs, or mentally deficient are usefully employed. The safeguarding of the cripples and the handicapped is a responsibility of the factory medical staff.

f.) *Sanitation of workshops and maintenance of satisfactory working conditions, prevention of accidents, etc.*

The duties of the industrial physician sometimes include coöperation with the engineering department in the study and control of such matters as ventilation, illumination, heat and humidity, dust, drinking water, sewage disposal, cleanliness of toilets and locker rooms, windows and electric lights, collection and disposal of refuse and extermination of insects and vermin. The sanitary inspection of the plant is usually an important duty of the industrial physician.

g.) *Health education of workers.*

Instruction in personal hygiene is usually carried on under the supervision or direction of the medical officer by nurses or other functionaries. Under this caption should be included the encouragement of athletics, games and outdoor recreation.

2. Diagnostic

Diagnostic skill is called for in handling the cases of applicants for positions, in the periodic re-examination of employees described above, and in the treatment of sickness among the employees whenever this is a part of the

medical service. The factory doctor often aids the physician in the community by placing at his disposal such superior equipment or ability as he may possess for the benefit of the patient. Skill in diagnosis is frequently called for in the equitable adjustment of compensation cases.

3. Curative

a.) *Treatment of medical cases.*

In some industries treatments of all kinds of illness is provided for the employee either at the hands of the medical department or by arrangement with outside agencies, the community hospital or the private practitioner of medicine.

b.) *Treatment of injuries.*

One of the chief duties of the medical department in an industrial plant is the treatment of injuries sustained in the course of work. These are mainly of a minor nature. In the Industrial Conference Board's study, it was found that in 207 factories employing 800,000 employees, only 2.86 per cent. of the injuries were sufficiently severe to justify compensation claims.

c.) *Redressing of wounds due to injuries.*

This work may consist of redressing wounds treated at the plant dispensary or the care of wounds originally dressed elsewhere in cases where the injury was too severe to treat at the plant dispensary in the first instance.

d.) *Hospital care.*

Some industrial plants are equipped with complete hospital and convalescent facilities for the care of their employees in any emergency whether their illness be due to their employment or to other causes.

e.) *Home care.*

Some plants provide medical attention to sick employees in their homes. Nurses may be sent to the home to give

whatever attention may be necessary and the physician may treat the patient in the home as well as in the dispensary.

4. Extra Medical Activities

This includes social service in the home or elsewhere, advice on medical problems, the giving of information as to where to obtain medical aid of one kind or another, and the like. Furthermore, within the scope of the industrial physician's work come such matters as the settlement of workmen's compensation cases; accident investigations; safety work and study of hazards in plant processes; supervision of mutual benefit associations in the plant; supervision of recreational activities of employees; supervision of the plant restaurant or the cafeteria service and the keeping of records.

As will be readily seen from this inadequate listing of activities, the opportunities of industrial physicians are extensive and vital in character.

Staff and Equipment

The personnel of the medical departments found in industrial organizations includes both general practitioners and specialists engaged either on a full or part time salary basis, or on call as well as nurses, technicians and clerical workers.

Full time physicians are usually employed by the larger establishments of 2,000 employees or over and in plants where the employment is extra hazardous like mining, while part time, or "on call" arrangements prevail in the smaller establishments or where there are assistants to full time physicians.

Nurses carry on the greater part of the work in establishments where the physician is merely on call or act as assistants to the physicians in the plants. Many of the medical departments in industrial and mercantile establishments employ the nursing personnel for home visitation of the sick.

Equipment may vary from the simplest dispensary to a complete hospital equipped to deal with all types of conditions. Over 95 per cent. of the factories in the United States employ less than a thousand workers and the small dispensary is the usual provision. In factories located in small towns with no other adequate medical facilities, the factory dispensary is well equipped and very often X-ray and laboratory work is done in the factory laboratory at a small charge at the request of the doctors in the community.

Administrative Relations

The medical department in an industrial plant may be under the jurisdiction of the employment department, the industrial relations manager or the production manager, or it may exist as an independent unit. It is held by most authorities that the medical department can do its best work when it is given the status of an independent department.

Cost of Medical Service in Industry

Costs vary with the industry and the type of service. Several surveys have been made to determine costs. One study carried on by the Conference Board of Physicians in Industrial Practice in 1917, included 95 factories. The average annual cost of medical and surgical supervision was calculated at $2.21 per employee. This figure is hardly representative of present day costs. In 1920 a survey of 1,521 factories was carried on by the Cleveland Hospital and Health Survey. In 72 factories which reported some type of medical service the average cost of medical service per employee was computed at $5.00 per annum. There was, however, a wide variation among the industries, some reporting as high as $11.23.

The more recent study conducted by the National Industrial Conference Board brings out this same variation in costs of medical service among the various industries.[7] In mining it is $13.86 per employee per annum; the next highest cost is in the smelting and refining industry where it

averages $7.49 per capita, while the lowest is $2.65 for the department stores.

Measured in terms of the payrolls of the factories, the aggregate cost of medical service in the industries studied was $3.60 for every $1,000 of the payroll. Measured by the value of the product it is found that for every $1,000 worth of product, medical costs reported amount to $1.02.

Costs per treatment range from 19 cents in some cases to $1.45 in others. In some instances the patients pay for medical service either at full cost or at a nominal price, while in others medical service is entirely free.

In the aggregate, the major item of cost is that of salaries of physicians and nurses. It amounts to 57.1 per cent. of the total expenses reported. Salaries of clerical and other assistants constitute 8.4 per cent., making 66.5 per cent. the total charge for the professional and clerical personnel.

There is great variation in the salaries paid industrial physicians. Clark [8] reports the following schedules: Working on a basis of two or three visits to the plant per week, the average fee is about $3.00 each visit lasting about one hour. A special fee is charged for calls to plants outside of visiting hours. Part time doctors spending about three hours daily receive from $1,200 to $1,800 a year, but in the case of highly trained men the salaries are much higher. Full time service is paid at the rate of from $1,800 to $5,000 per year, depending on the experience of the physician. In large plants of over 4,000 employees, the physician's salary is $10,000 and more. As a rule, the figures mentioned are in addition to equipment, transportation, supplies and in some cases maintenance is also provided.

Industrial nurses receive from $1,483 to $1,858 per annum. The average salary for a female dispensary nurse is $1,438 per year, the average for a visiting nurse is $1,441 and the average salary for a male dispensary nurse is $1,858.

Conclusions

Medical service in industry is evidently no longer an experiment, but a well established feature of modern business organization. It has seemingly demonstrated its value to the health of workers and to the benefit of industry. As the opportunities for scientific work increase and as compensation becomes more adequate, larger numbers of competent medical men are being attracted to the service, on either a whole or part time basis. They realize the many contributions which by virtue of their position they can make to medicine and to social welfare. Occupational hazards and industrial hygiene have not received in this country the study and attention their importance warrants: nor has the existing knowledge been applied with sufficient thoroughness, except in selected industries or in individual establishments. The expansion of medical service in industry may considerably advance governmental and private endeavors in this direction.

Appendix

Since the writing of this report, the U. S. Bureau of Labor Statistics published a bulletin [9] prepared by Anice L. Whitney. One chapter of this bulletin is devoted to the medical service provided by industry. The following two tables are taken from this report. They give interesting statistical data by types of industry.

Number of establishments having emergency hospitals or first-aid equipment and number and class of medical attendants, by industries: [9]

Industry	Employees				Number of establishments reporting				
	Number of establishments	Male	Female	Total	First aid equipment only	Hospital or emergency rooms	Doctor	Nurse	Attendants trained in first aid
Automobiles	19	239,006	8,933	247,939		19	16	18	7
Boots and shoes	5	14,959	10,081	25,040		5	4	5	
Chemicals and allied products	7	9,245	4,660	13,905	2	5	5	5	2
Clothing and furnishings	16	8 367	19,100	27,467	8	8	7	7	6
Electrical supplies	18	61,578	18,259	79,837	1	17	15	16	3
Fine machines and instruments	13	38,774	14,418	53,192		13	12	13	
Food products	12	11,826	8,711	20,537	1	11	8	8	2
Foundries and machine shops	49	112,116	13,091	125,207		49	44	40	13
Iron and steel	11	†277,905	†15,479	302,384		11	11	9	4
Mining, coal	7	†26,183	†102	†26,285	2	5	7	2	9
Mining, other	16	23,219	60	23,279	1	15	14	14	4
Offices	18	16,513	23,350	39,863	2	16	15	16	2
Ore reduction and smelting	6	8,593	152	8,745		6	4	4	1
Paper and paper goods	10	8,605	3,264	11,869	2	8	8	8	2
Printing and publishing	5	4,854	3,781	8,635		5	1	4	
Public utilities (gas, electric light and power, telephone and telegraph)	17	88,423	33,658	122,081	3	14	15	11	3
Railroads, steam and electric	13	†113,387	†6,360	352,145		13	12	10	2
Rubber and composition goods	11	51,733	13,685	65,418		11	8	11	
Stores	51	‡46,602	‡84,685	136,850	1	50	39	49	2
Textiles	43	39,214	34,921	74,135	3	40	33	38	6
Other industries	60	†100,028	†29,309	143,075	8	52	33	44	10
Total	407	§1,301,130	§346,059	†1,907,888	34	373	311	332	75

†Not including employees of 1 establishment not reported.
‡Not including employees of 3 establishments not reported.
§Not including employees of 7 establishments not reported.

Number of companies reporting cases treated and average number of accident and medical cases and retreatments per month, by industries:

Industry	No. of establishments	No. of employees	Average number of cases treated per month: Accident — New	Accident — Total, including retreatments	Medical — New	Medical — Total, including retreatments	Total accident and medical — New	Total accident and medical — Total, including retreatments
Automobiles	12	190,989	70,999	162,884	43,814	44,823	114,813	207,707
Clothing and furnishings	2	4,860	480	607	1,027	1,244	1,507	1,851
Electrical supplies	7	39,516	6,498	18,890	8,593	9,332	15,091	28,222
Fine machines and instruments	5	15,826	2,721	8,288	3,129	3,759	5,850	12,047
Food products	3	10,554	2,836	3,903	3,091	3,210	5,927	7,113
Foundries and machine shops	†17	38,638	6,995	16,465	8,157	16,437	15,152	32,902
Gold and silver ware	2	3,605	503	1,239	514	514	1,017	1,753
Iron and steel	‡3	18,200	1,926	10,648	204	711	2,130	11,359
Oil refining	1	13,738	1,139	4,671	1,637	3,814	2,776	8,485
Offices	2	10,593	1,004	2,596	2,162	4,152	3,166	6,748
Ore reduction and smelting	1	2,600	702	1,979	185	185	887	2,164
Paper and paper goods	5	5,412	579	1,365	1,508	2,058	2,087	3,423
Printing and publishing	2	5,511	425	1,211	2,404	3,404	2,829	4,615
Public utilities (gas, electric light and power, telephone and telegraph)	3	51,918	7,440	15,868	12,966	14,312	20,406	30,180
Railroads, electric	1	12,000	300	1,035	260	495	560	1,530
Rubber and composition goods	6	33,489	7,879	16,037	8,443	13,421	16,322	29,458
Slaughtering and meat packing	1	7,700	500	2,000	400	1,000	900	3,000
Stores	4	14,850	943	1,240	3,370	4,854	4,313	6,094
Textiles	12	32,255	3,062	10,884	6,343	7,958	9,405	18,842
Other industries	9	16,254	3,635	8,634	4,936	8,431	8,571	17,065
Total	§98	528,508	120,566	290,444	113,143	144,114	233,709	434,558

†Including 1 establishment in which no medical cases are treated.
‡Including 2 establishments in which no medical cases are treated.
§Including 3 establishments in which no medical cases are treated.

REFERENCES

[1] Waste in Industry, p. 21, Committee on Elimination of Waste in Industry of the Federated American Engineering Societies: McGraw Hill Book Co., 1921.

[2] Paper read before the Industrial Hygiene Section of the American Public Health Association, Cincinnati, Oct., 1927.

[3] The Health of Office Workers, Wade Wright, M.D., Proceedings of the Convention of The Life Office Management Association, Atlantic City, 1927, Metropolitan Life Insurance Co.

[4] Disability Among Workers Caused by Respiratory Diseases, *Public Health Report*, U. S. Government Printing Office, Vol. 43, number 1, March 16, 1928.

[5] C. O. Sappington, M.D., Dr. P. H.—"Preventive Medicine in Industry," *Jour. Ind. Hygiene*, Jan., 1927. Vol. 9, pp. 12-17.

[6] *Monthly Labor Review*, Jan., 1927.

[7] Medical Care of Industrial Workers: National Industrial Conference Board, N. Y., 1926.

[8] W. Irving Clark, M.D.—"Health Service in Industry," p. 105; Macmillan, 1922.

[9] Health and Recreation Activities in Industrial Establishments, 1926 *Bulletin U. S. Bureau of Labor Statistics*, No. 458, Washington, 1928.

Combined Meeting of the Sections of Otology and Laryngology and Rhinology, April 25, 1928

LABORATORY AIDS IN OTOLOGY*

SAMUEL J. KOPETZKY

Otology, during the past twenty years, has been greatly enriched by the products of research. From a narrowly restricted field it has so broadened that it now encroaches upon several of the specialties to which it formerly bore only a remote relationship. In its growth, it was only natural that the confusion and awkwardness of adolescence should accompany the new lore. Now that it has passed that stage, it is imperative that it classify its knowledge, cross-index the new with the old and discard the worthless. We will then be ready for further additions, which, like the ordered parts of a mosaic, can be fitted into their proper places.

While otological surgery has progressed remarkably during these years, it is in the utilization of the numerous advances in laboratory medicine that an even more remarkable progress has been made, particularly in the field of diagnosis. But here the cross-indexing is not yet complete; and I propose, by correlating the laboratory aids at our disposal with our already well indexed clinical data to clarify some of the confusion which is manifest.

The diagnosis of the surgical diseases in otology has far surpassed our ability to recognize the non-surgical conditions. It is therefore evident that the laboratory has aided us more accurately in the recognition of the former types of lesions. By study of the blood, the cerebrospinal fluid, the bacteriological flora and the roentgenographic pictures of the mastoid process, clinical diagnosis has been rendered a great deal more precise in surgical otology. In the non-surgical diseases of the ear, while laboratory studies have as yet yielded scant information, here too great promise is held forth. I shall speak first of the laboratory aids in the diagnosis of the surgical diseases of otology.

*From the Oto-Laryngological Department of Beth Israel Hospital.

Blood Studies:

The routine estimation of the *red cell count* has not been accorded the position its importance warrants. I have found it of great diagnostic value. Examination of the red cells, however, is never complete without an estimation of the hemoglobin percentage. The two go hand in hand as a diagnostic aid, both before and after an operative procedure. I have repeatedly emphasized the distinction between the two types of acute mastoiditis, the acute coalescent mastoiditis and the acute hemorrhagic mastoiditis. The former is the one most generally encountered. There is a breaking down of the intercellular walls, a coalescence of the cells and the formation of pus and granulations. The hemorrhagic type is more rare. It is characterized by a multiplicity of thrombi in the minute venules of the lining of the mastoid cells. In this type we never see a coalescence of the cell walls with a consequent formation of pus. The lesion, no matter what its stage at operation, always exhibits intact cell walls. Clinically, the marked tenderness over the mastoid process, the severe prostration and the septic temperature presented at the onset of the ear lesion are never in accord with the otoscopic picture where no sagging of the canal wall and no profuse discharge are evident. Those of you who have seen such cases during the late influenza epidemic will recall what were considered to be unusual findings at operation. But the sharp recovery after operation on the mastoid process warranted the continuance of surgical intervention in these cases, although they presented none of the classical signs of acute mastoiditis.

Bacteriological investigations showed this type of mastoiditis to be due to the streptococcus hemolyticus. It is in the hemorrhagic mastoiditis, particularly, that repeated examinations of the red cells and the hemoglobin percentage will result in early recognition of the lesion. In a patient who presents an acute purulent otitis media, accompanied by septic temperature and severe prostration from the outset of the disease, a daily decrease in the number of

red cells and in the percentage of hemoglobin speaks for a diagnosis of acute hemorrhagic mastoiditis, and indicates an immediate simple mastoidectomy where all other conditions have been eliminated. Since the lesion in this type of mastoiditis is present in the small vessels within the mastoid process, the hemolytic streptococci present within the infected thrombi destroy the hemoglobin and the red cells of the blood stream. This is evidenced by the gradual fall in the number of red cells and in the percentage of hemoglobin.

After a simple mastoidectomy in this type of mastoiditis, thorough exenteration of the mass of infected thrombi is followed by a subsidence of the sepsis and a gradual return of the red cells and hemoglobin to normal. Should the reduction in the red cells and hemoglobin continue after the simple mastoid operation, a further extension of the disease into the lateral sinus should be suspected, and a transfusion of whole blood is in order. If the reduction still continues, the lateral sinus should be obliterated and the internal jugular vein ligated regardless of whether or not the outer wall of the sinus is diseased. Since the sinus thrombosis in this type of mastoiditis is produced by the intravenous extension of the minute thrombi directly into the lateral sinus, there will rarely be found any erosion of the sinus plate or any evidence of a periphlebitis. In this type of mastoiditis, continued reduction of the red cells and the hemoglobin after operation furnishes a better diagnostic aid than the appearance of the sinus wall.

In the acute coalescent mastoiditis, a daily study of the red cells and hemoglobin throughout the period of hospitalization subsequent to operation will always lead to an earlier detection of a sinus thrombosis where a hemolytic organism is the offending factor. In these cases, the earliest appearance of a thrombosis will be manifest in a gradual daily decline in the number of red cells and the percentage of hemoglobin. Where the hemoglobin falls steadily, and where the clinical signs of sepsis are absent, a transfusion will replace the lost hemoglobin and so add to the patient's

resistance. On the other hand, a persistent unilateral headache after operation, accompanied by an increased leucocytosis and a gradual fall in the number of red cells and the percentage of hemoglobin, should lead one to inspect the interior of the sinus for the presence of a thrombus. The utilization of the red cell and hemoglobin estimation as a routine in every case of mastoiditis will afford an early guide in the detection of otitic sepsis, whether it be due to an acute hemorrhagic mastoiditis or to a complication of an acute coalescent mastoiditis or to a chronic mastoiditis.

The White Cell Count:

The study of the *white cells* furnishes us with a diagnostic as well as a prognostic aid. In the ordinary white cell count, the otologist is interested in the total number of white cells and the percentage of polynuclear cells. The former is the index of the resistance of the individual while the latter indicates the severity of the infection. Utilizing this as a foundation, McKernon drew up a chart whereon the total number of leucocytes could be compared with the percentage of polynuclear cells. He determined that with a given number of leucocytes a patient could present a certain maximum percentage of polynuclear cells before his resistance was overcome by the virulence of the infection. Once this was determined, we had at our disposal an excellent prognostic guide. Knowing the maximum number of polynuclears that is compatible with any given leucocytosis, we can determine at a glance whether or not the patient has sufficient resistance to combat the infection. Where the percentage of polynuclears exceeds the maximum allowed for any given number of leucocytes, the patient's resistance is succumbing to the infection. On the other hand, where the polynuclear percentage is less than, or equal to, the maximum allowed for any given total leucocytosis, the resistance of the patient is good. The use of these resistance charts will be found of inestimable value in prognosticating the outcome of any otitic infection.

The white cell count is also of value as an indication of an impending complication. After a simple mastoidectomy, the white cell count should show a rapid decline toward normal. A persistent leucocytosis with an increase in the percentage of polynuclear cells is indicative of a continued infection. A careful observation of the patient is necessary in such cases to determine the source of the infection that is causing the leucocytosis to persist. Most frequently it is due to the continuation of purulency in the middle ear; and an increased white cell count may be noted until the middle ear infection has subsided. If, however, the increased leucocytosis is accompanied by a unilateral headache, an extension of the disease beyond the mastoid process should be suspected. Where, following operation, the leucocytosis subsides only to recur after an interval of time, accompanied by unilateral headache, a sinus thrombosis should be strongly suspected. I have had several cases of sinus thrombosis subsequent to the acute coalescent mastoiditis wherein the only signs that led to a diagnosis of sinus thrombosis were the persistent unilateral headache and the increased leucocytosis. In these cases I had no other signs or symptoms of sepsis on which to base a diagnosis.

Recently I have had experience with the method of counting the white blood cells devised by Schilling and introduced at Beth Israel Hospital by Dr. Arthur Weiss. In brief, the count is made as follows: The total number of cells is tabulated as heretofore. In the differential count, however, particular attention is paid to the various morphological forms of the polynuclear cells. One notes the percentage of mature polynuclear, that is, those in which the nucleus has undergone complete segmentation, and the percentage of young polynuclears, wherein the nucleus is still unsegmented and appears in the form of a rod. The latter type are called the "staff cells." In a normal count, the young forms, or staff cells, number less than 5 per cent. At the onset of an acute infection which produces a polymorphonuclear leucocytosis, there occurs a marked increase in the number of these immature staff cells. This

is due to the fact that the bone marrow is stimulated to produce an excess amount of polynuclears to combat the infection and these cells are thrown into the general circulation before their nuclei have had time to undergo complete segmentation. In addition to this, the percentage of lymphocytes diminishes. This picture has been termed a "shifting to the left." As the infection subsides, the number of staff cells also becomes less until "normal" is finally reached. The blood picture does not have any relationship to the temperature curve but is in direct relationship to the virulence of the infection and the resistance of the patient. Where, following a simple mastoidectomy, the number of staff cells continues high, that is, above 15 per cent., it is indicative of a continuation of the infection. It is not diagnostic of any complication but it should put the surgeon on guard to watch for the clinical signs of a complication. The continuance of a high staff count, or the reappearance of one after it has returned to normal subsequent to aural surgery, should be viewed with the utmost suspicion.

I have found this method of counting the white cells of inestimable value in determining the procedure to be followed in the so-called borderline cases. Where a mastoiditis is presented and one is in doubt as to whether or not to operate, the staff cells will furnish an excellent guide in helping one to reach a decision. Where the staff cells increase in number on several daily examinations and reach 12 per cent. or more, operation is indicated. On the other hand, where the percentage of staff cells remains stationary below 12 per cent., or shows a gradual reduction, operation can be postponed with safety and the patient kept under further palliative treatment.

Blood Culture:

Before discussing the results of blood culture and the importance to be attached thereto, I should like to discuss as briefly as possible the pathogenesis of a sinus thrombosis. In the acute coalescent and the chronic mastoiditis, there occurs a gradual destruction of the mastoidal

structure until the inner table is reached. The inner table overlying the sinus is then subjected to pressure from the pent-up pus and undergoes necrosis. The outer wall of the sinus is thus brought into direct contact with the purulency within the mastoid process. The pressure against the wall of the sinus causes a narrowing of the blood channel with a consequent slowing of the blood stream. In addition, the outer wall of the sinus becomes infected by the pus in the mastoid process and we then have a sinus periphlebitis. If the mastoid is operated upon at this point, there is found a protective layer of granulations over the sinus wall at the exposed area. On the other hand, should this periphlebitis be permitted to progress so as to involve the endothelial lining of the sinus, the injury presented to this lining membrane, plus the narrowing of the channel and the slowing of the flow of blood, offer all the elements necessary for the production of a thrombus formation. This thrombus is protective in nature and is at first sterile. If the round cell infiltration and granulations on the outer coat of the sinus are not sufficient to keep out the organisms from within the sinus, the thrombus will become secondarily infected and we then have an infected thrombus within the sinus. This thrombus grows with and against the blood stream and only its central portion is infected; its extremities are sterile. Therefore, if a blood culture is taken at this stage of the thrombosis, no growth of organisms will be noted. If nature is successful in localizing the infection by causing a fibrosis of the thrombus, a positive culture will never be obtained. It is only when the thrombus has undergone disintegration that infected particles will gain entrance to the general circulation and on culture of the blood a positive growth of bacteria will be obtained. To permit every sinus thrombosis to go on to this stage before operative intervention is undertaken, is not in accord with the best principles of surgery. One does not wait for an acute suppurative appendicitis to rupture before removing it surgically. So, in otology, one must not view a negative blood culture as ruling out the presence of an infected thrombus within the

sinus where the clinical symptoms point to its presence. Too much reliance has been placed upon the blood culture as a means of diagnosing sinus thrombosis. It has its value as a diagnostic measure but is not nearly as reliable in the greatest proportion of cases as the red cell and hemoglobin estimation and the white cell count. The findings at the primary operation on the mastoid process, coupled with the appearance of temperature, unilateral headache, etc., are also of far greater diagnostic value than the results of blood culture. In the last 18 cases of sinus thrombosis upon which I have operated, the blood culture was positive only in four of them. In two instances wherein I had obtained a positive blood culture of streptococcus hemolyticus in cases of sepsis subsequent to mastoid surgery, I excluded a sinus thrombosis from the clinical picture presented by the patients because of other factors. In both instances the patients recovered without resort to surgery on the blood vessel.

A positive blood culture is more apt to be found in cases of sinus thrombosis subsequent to the hemorrhagic mastoiditis. Here the thrombosis in the lateral sinus is the result of the direct growth of a smaller thrombus from one of the venules in the cellular walls into the larger vessel. The sinus plate is not eroded, no perisinal abscess is found and there is no involvement of the outer coat. The thrombus in this instance is infected from the outset and is more often of the mural than the occluding type. The blood stream, in passing, washes some of the organisms into the general system, and a positive blood culture is obtained much earlier than in the thrombosis following the acute coalescent mastoiditis.

In addition, a negative blood culture is to be expected where metastatic lesions are present. These lesions, particularly if they are located in the soft parts, act as fixation abscesses and clear the blood stream of infection. If the bacteria gain entrance to the pulmonary circulation, they are apt to lodge there and produce their characteristic lesion without ever reaching the general circulation.

Blood Sugar:

A blood sugar determination should always be part of the routine examination of any adult suffering from a mastoiditis. A diabetic who is under treatment will often show no sugar in the urine while an estimation of the blood sugar will reveal a hyperglycemia. Diabetes produces that type of ear lesion which has been termed the painless type of acute coalescent mastoiditis. An extensive necrosis of the mastoid process may exist and yet the patient have no pain nor tenderness. Where the otoscopic picture and the duration of the disease point to a definite acute surgical mastoiditis but where, because of the absence of pain and temperature, one is inclined to temporize, the finding of an increased blood sugar is a warning of the danger that diabetes presents. If such a case is permitted to proceed without surgical intervention, the pain and temperature will eventually appear concomitant with an intracranial lesion.

The Cerebrospinal Fluid:

Lumbar Tap: A lumbar puncture is indicated in every case of chronic suppurative otitis media before operation is undertaken on the mastoid process. It is indicated in every case of postoperative simple mastoidectomy wherein an intracranial lesion is suspected. The information to be gained at the time of the tap is the amount of intraspinal pressure and the presence of a block between the intracerebral and the intraspinal subarachnoid spaces. The latter can be determined by noting the rise in manometric pressure following jugular compression. If the spinal fluid is permitted to run into a mercury manometer, the pressure of the spinal fluid can be read. If pressure is then brought to bear over the internal jugular vein, first on one side and then on the other, a rise is noted in the intraspinal pressure where no obstruction exists between the intracranial space and the spinal column. Incidentally, Tobey and Ayres have utilized this procedure in the differential diagnosis of sinus thrombosis in cases of bilateral mastoiditis. The side whereon the thrombus is

present is obstructed and consequently compression of the internal jugular on that side will cause no rise in the intraspinal pressure. I have utilized this procedure to great advantage and found it to be an excellent diagnostic measure. It is not infallible, however. Where a thrombus is not of the obliterating type, compression of the jugular will permit a rise in intraspinal pressure. Then again, in one of my cases wherein I had completely obliterated the lateral sinus after incision and resection of a portion of the outer wall, but wherein the internal jugular vein had not been operated upon, compression of the internal jugular vein on the side of operation caused a rise in intracranial pressure equal to the rise obtained from compression of the opposite internal jugular vein. This case has been reported by me elsewhere.

In cases of acute labyrinthitis following suppurative otitic disease, the spinal fluid will serve as a diagnostic measure in determining whether or not the labyrinthitis is of the suppurative type. Where the spinal fluid shows no increase in the number of cells, has a normal chemistry and shows but a slight increase in pressure, the labyrinthitis is of the serous variety. On the other hand, where a large increase in cells is noted and the albumin is increased, a suppurative labyrinthitis is to be suspected. If the increase in cells is predominantly lymphocytic, one can continue to employ palliative measures. Where the increase is largely polynuclear, a threatened invasion of the subarachnoid space is indicated and operation is advisable. This is especially true if, on successive taps, a high lymphocyte count is found to be replaced by a high polynuclear count.

If examination of the spinal fluid shows a high cell count, lymphocytic or polymorphonuclear, increased albumin and globulin and increased pressure, but no bacterial growth, one is dealing with a sympathetic meningitis. This is always indicative of a threatened invasion of the subarachnoid space. It can be produced by a sinus thrombosis, brain abscess or suppurative labyrinthitis.

Where such a fluid is obtained, every measure must be employed to eradicate the focus of infection immediately, if a suppurative meningitis is to be averted.

One of the earliest findings in the spinal fluid in cases of suppurative meningitis due to a fermentative type of bacteria is a reduction in the percentage of glucose normally found in the spinal fluid. This is often demonstrable even before any organisms can be isolated. Where the copper reduction is absent or diminished, a suppurative meningitis can be diagnosed even though no bacteria can be isolated on smear or culture.

Bacteriology:

A culture of the pus from the middle ear is of no value unless taken very soon after the paracentesis or spontaneous rupture of the drum. Cultures taken after twelve hours or so will almost always show a mixed infection due to contamination. A culture of a chronic aural discharge is of no value at any time because the organism isolated is usually different from that which produced the lesion originally.

There are only four organisms which when isolated from an aural discharge influence the management of a case: The Klebs-Loeffler bacillus, the Vincent's bacillus and spirillum, the streptococcus mucosus capsulatus and the Friedländer's bacillus. The bacillus of diphtheria naturally indicates specific treatment with antitoxin. The Vincent's bacillus and spirillum necessitate salvarsan. The other two organisms depict an extremely dangerous type of lesion, insidious in character and asymptomatic in its course. Because of the very nature of the disease, it often goes on to intracranial invasion with no clinical evidence of its progress. Hence the finding of the streptococcus or the bacillus mucosus capsulatus indicates early complete surgery on the mastoid process in order to forestall intracranial invasion. It is true that a number of cases wherein these organisms have been found recover without any operative measures, but the seriousness of the mastoiditis

due to these bacteria must be considered from the standpoint of the high mortality presented.

Roentgenographic Examination:

Roentgenographic examination of the mastoid process is to be considered an accessory laboratory aid in otological diagnosis. The otologist should be able to interpret the findings on radiographic examination of the mastoid himself. One cannot expect the roentgenologist to make a clinical diagnosis from the plate; and the roentgenologist who does so is presumptuous unless he is specially trained in otologic pathology. An x-ray examination will yield anatomical data and will show whether or not cellular destruction is present. It will not label the case as surgical or non-surgical, acute or chronic, emergent or non-emergent. This the otologist alone can determine by a correlation of the clinical, laboratory and x-ray findings.

In every acute middle ear infection, a clouding of the mastoid process will be noted. This is due to the edema of the cellular lining which accompanies every acute middle ear suppuration. The same cloudiness will also be found in cases of external otitis accompanied by inflammation of the periosteum over the mastoid process. In the absence of any evidence of cellular destruction, the finding of a cloudiness of the mastoid process has no significance from a clinical standpoint.

Where the diminution in illumination is accompanied by evidences of cellular destruction in an acute middle ear infection, an acute coalescence of the mastoid cells is indicated. Here, however, the clinical appearance of the ear and the general systemic reaction will guide the surgeon in his determination as to whether or not the case is a surgical one. A certain amount of mastoidal destruction may exist and yet the case may recover without surgical intervention on the mastoid process. In such instances successive mastoid plates are valuable to check the progress of the destruction. In a patient who has had one or

more attacks of mastoiditis prior to the current acute attack, the finding of cellular destruction on the mastoid plate may be the result of the previous mastoid inflammations. Here, also, repeated x-ray examinations are valuable in determining whether there is an extension of the destruction.

In a case which has been under observation for a greater length of time than that usually required for the cessation of an acute aural suppuration, the finding of an extensive cellular development of the mastoid process with a small amount of destruction would tend to indicate a beginning chronicity and operative interference is usually advisable before complete destruction occurs. On the other hand, the same amount of destruction in a small mastoid process would indicate that the infection was being walled off and would recede of its own accord.

Very frequently, on a well-taken plate, an erosion of the sinus plate or tegmen can be noted by a break in the continuity of the shadow cast by these structures. In this way an epidural or perisinal abscess can be detected.

In the chronic purulent otitis media, a sclerosis of the mastoid process will be noted in every case. This is not to be interpreted as indicating a radical mastoid operation for it will be found in all cases—dangerous and non-dangerous—of chronic purulent otitis media.

In taking plates of cases with severe prostration, a septic temperature curve and a bacterial report of streptococcus hemolyticus, the negative finding of undestroyed intercellular bony walls is a clue to the fact that we are dealing with the hemorrhagic type of mastoiditis. In other words, failure to find bone destruction is substantiation of the diagnosis of hemorrhagic mastoiditis and usually indicates surgical intervention.

In discussing the laboratory aids at our disposal in the diagnosis of the non-suppurative otitic diseases, I am sorry that I will not be able to speak as definitely as I have of

their help in the suppurative otitis. Our main problem in this field is deafness and I feel that laboratory medicine will do more to help solve this problem than anything we may do in perfecting the testing of hearing. All our hearing tests have until now done nothing but confuse us. They have afforded us a classification of deafness which is largely erroneous and which, used as a basis for investigation, has misled us. Permit me to digress for a moment to make clear just what I mean. For example, a hearing test may yield results characteristic of a so-called catarrhal deafness and yet an acoustic neurofibroma is found to be the cause of the loss in hearing. A typical hearing test of a so-called otosclerosis is found to be due to syphilis of the central nervous system. These are actual occurrences from my practice and I could quote many others.

I have accordingly come to view deafness from a different standpoint—whether or not it is progressive in character. Some patients in whom a loss of hearing is present will never get worse, whereas others show a gradual progression of the loss in hearing acuity. Consequently, the division of deafness into progressive and unprogressive types permits a study of this condition from a new angle; namely, what causes the deafness to progress. That the cause may be different in each case is granted. Whether it is endocrine, toxic, infectious, the result of inherited latent characteristics or the product of faulty metabolism, is yet to be determined. In all probability each of these factors plays a role.

Blood Chemistry:

In studying these cases, Almour and I have found that most patients with progressive deafness show a derangement of the calcium content of the blood. In cases of long standing, a decrease in the calcium content is noted. In the more recent and active cases, an increase is more apt to be found. In conjunction with the calcium derangement, a great number of the cases show a high uric acid in the blood.

Just what the significance of this finding is, I do not know. We originally reported it as an observation and as an aid in the diagnosis of chronic progressive deafness. While we have several theoretical explanations, we are as yet unable to account for it definitely. Nevertheless, I consider it a valuable diagnostic aid, in helping to differentiate the progressive from the stationary types of deafness.

Wassermann:

The Wassermann test should be a routine procedure in all cases of deafness. Syphilis does not always yield the typical acoustic reactions of a nerve deafness, either with the forks or with the audiometer. Where, on examination of the blood, a negative Wassermann is obtained but syphilis is strongly suspected from the clinical data, a spinal fluid Wassermann and colloidal gold test are advisable.

X-Ray:

In the diagnosis of deafness, too, the x-ray holds forth a possibility of help. Joseph C. Beck, in 1915, made a preliminary report of the finding of changes in the long bones in cases of otosclerosis. With a view to checking his findings and learning what possible lesions might be presented, I had Dr. Henry K. Taylor make a roentgenographic study of the long bones in several of my cases of deafness. In those cases wherein I had made a diagnosis of progressive deafness, Dr. Taylor reported changes in the periosteal coverings of some of the long bones. In two of the cases he found early evidences of cystic formation in the cranial vault indicative of an early Paget's disease. In those cases which were non-progressive in character, no abnormalities were found in the skeleton. Here also I am unable to explain the findings. I simply submit them for your study and future investigation.

The correct estimation of laboratory criteria removes many cases in otologic practice from groups to which preconceived routine therapy is applied. It permits an individualization of treatment according to the given case because it furnishes data so significant as to differentiate

conditions which appear clinically alike. Thus details of pathology are better comprehended, the management of cases becomes increasingly resourceful and results are more uniformly successful.

In conclusion, I desire to stress the importance of the role which bedside observation plays in all otological cases and to emphasize the need of accurate clinical observation. In the last analysis, it is good clinical judgment which furnishes the foundation upon which laboratory aids build in making diagnoses.

Section of Otology, May 11, 1928

UNUSUAL CASE OF CHRONIC MASTOIDITIS

JOHN HORN

A case of bilateral otitis media, purulenta chronica, chronic mastoiditis. Right ear with a fistula in the outer border of the posterior wall of the external auditory canal. Simple mastoid operation. Recovery.

Patient, a girl of fourteen, who gave a history of having had discharging ears for seven years. Examination, October 16, 1926, showed both canals filled with a foul smelling secretion; drum membranes lacking—no ossicles present. The outer border of the posterior wall of the right external auditory canal showed a fistula containing thin pus. This was carefully probed, the probe entering a cavity. A crucial incision was made through the opening and with a blunt curette some diseased bone removed. Simple mastoid operation three days later. Bone was found markedly sclerosed and deep layer of cells diseased; thorough curetting, especially in the region of fistula. Small area of sinus exposed during operation. Wound was drained with gauze strips and closed with catgut sutures. Uneventful recovery. Discharged from the hospital after three days.

Post-operative treatment of O.M.P.C., both ears with Unguentum Credé (Horn). Right ear dry after six weeks. Except for the fistulous opening there were no other symptoms. The left ear still has a slight colorless discharge. Hearing in both ears has improved.

SHORT REPORTS OF FIVE INTERESTING CASES OF ACUTE MASTOIDITIS

CLARENCE H. SMITH

CASE 1

William G., aged 30, admitted to hospital February 9, 1928, unable to walk, violent vertigo, falling, nausea and vomiting; nystagmus to healthy side, total deafness diseased ear. Acute inflammation right ear one week's duration. Myringotomy improved subjective symptoms. Simple mastoid operation alleviated all symptoms tremendously and recovery was rapid and complete, except that this labyrinth was completely ablated. This was acute suppurative labyrinthitis complicating acute purulent otitis media.

CASE 2

Pasquale M., aged 35, admitted to hospital February 22, 1928, acute suppurative mastoiditis left, complaining vertigo, nausea and vomiting; nystagmus to diseased side and hearing present in diseased ear. Had had these symptoms three weeks. Extensively necrotic mastoid found on Schwartze operation. Subjective symptoms improved, became dispensary patient for dressing. March 18, brought back to hospital fulminating meningitis. This was another case suppurative labyrinthitis complicating acute purulent otitis and mastoiditis which went on to meningitis.

CASE 3

Jack T., 3½ years of age, ordinary case mastoiditis, March 16, 1928, apparently usual convalescence, but 19 days after operation child had two rises temperature to 105. On examination marked anemia found, hemoglobin 50 per cent., other symptoms negative, except low grade septic temperature which persisted for a few days. Transfusion April 3 of 150 c.c. blood, but fever was unimproved. April 8, temperature peak became higher, to 105. Marked enlargement cervical glands, side of mastoid. Blood count now showed leucocytosis 24,000. Another transfusion, this time of 250 c.c. blood, given and temperature dropped, then complete recovery.

Case 4

Joan S., 2½ years of age, first seen January 27, 1928, with history that she had been running daily temperature from normal to 105 for seven days. Double myringotomy, marked unilateral cervical adenitis. Recession fever for few days, but high range recommenced, temperature from 96 to 106. Double mastoidectomy. For nine days daily rise to 102. Then higher range to 104 and more. Transfusion 160 c.c. blood for hemoglobin of 50 per cent. Temperature persisted. Second transfusion 15th post-operative day with 250 c.c. blood, brought temperature down to daily rise of 101, this persisted for 12 more days, when peak became higher again, around 103. Cervical adenitis had continued all this time. Tonsillectomy performed, clearing up glands and bringing temperature to normal permanently. This was case of double acute suppurative mastoiditis of virulent type, complicated by cervical adenitis caused by infected tonsils.

Case 5

Florence A., 2½ years of age, first seen February 15, 1927, with scarlet fever, pertussis and subperiosteal abscess right. Mastoidectomy, sinus plate necrotic, sinus exposed. Seven days later complication of bronchopneumonia. In paroxysm pertussis, sigmoid sinus ruptured, bleeding controlled by tight packing. Twelve days later another and very severe hemorrhage from sinus. Transfusion. Second transfusion, pyemia, positive blood culture. About two dozen pyemic abscesses. Third transfusion. Ligation internal jugular under local anesthesia. Fourth transfusion. Fifth transfusion. Mastoidectomy opposite side. Bronchopneumonia opposite side. Secondary mastoid operation original side. Modified radical operation original side. Recovery after seven months in hospital.

THE FINDING OF CONTRACTION OF THE VISUAL FIELDS IN CASES OF PROGRESSIVE DEAFNESS

Report of Cases and a Comparison with Cases of Deafness of Other Types

Mark J. Gottlieb

According to the understanding herein implied, progressive deafness is a condition in which the hearing organ becomes gradually more deficient in the capacity to perceive and convey sounds to the brain. It is caused by some constitutional abnormality and therefore may also be termed "constitutional" deafness. It occurs more frequently in women than men. It may begin at any age, but it more commonly has its onset in late adolescence or early adult life. Its onset is insidious, the patient not experiencing its presence until a fairly large portion of the hearing ability has been incapacitated. One of the first symptoms is tinnitus which is very annoying. Dizziness may be an early or late symptom, but it is not common. Paracusis is a frequent experience.

Those who have no middle ear inflammation have normal drums and patent Eustachian tubes. At times a pink zone is seen through the drum in the region of the promontory.

The classical findings are raising of the lower tone limit, prolongation of bone conduction, negative Rinné, a history of heredity, and abnormalities in the blood chemistry figures.

This entire picture may not be present, and when one or more of the findings are absent the diagnosis may be in doubt. This is particularly so in the incipient cases.

The purpose of this report is:

1. To call attention of otologists to the concomittant presence of contraction of the visual fields in cases of progressive deafness.

2. To stimulate others to make examinations of the visual fields in cases of deafness of obscure origin so that by an increase in the number examined and reported, its value as a diagnostic aid may be properly evaluated.

The histories in this report include five cases of progressive deafness and five of other forms of deafness. In addition, eight other cases were examined, the histories of which are not reported. They include two cases of hay fever with no history of deafness; one case of chronic purulent otitis; one case of nerve deafness following acute purulent otitis media and four other cases that were apparently well. All of these had normal visual fields for form and color.

Since December 9, 1927, ten cases of supposed otosclerosis or constitutional deafness were carefully studied; seven of these had contracted visual fields, the remaining three had normal fields.

Drury (Otosclerosis; *Annals of Otology, Rhinology and Laryngology*, vol. xxxv, No. 3, p. 651) reports two cases that were exhaustively studied. Included in his observations were the visual fields. He found in one, contraction of the fields for form and color and an evidence of previous inflammatory condition of the nerve heads; in the other, contracted form and color fields, enlarged blind spots and disc changes, suggestive of previous inflammatory changes.

In an earlier portion of his article Dr. Drury says: "In a study of the connection of otosclerosis with disturbed function of the endocrine system covering a period of two years and involving careful observation and study of a series of over a hundred cases, etc."

From this it is fair to presume that the two cases he reported in the paper in question were the only ones in which the visual fields were taken. For if such an examination had been undertaken on others, he would have been impressed with its presence even though it did not occur with the regularity that is found here.

We know that contraction of visual fields does not occur in all cases of progressive deafness. If it is encountered in a fair proportion of cases, it may have a value in classifying cases that come within the category of progressive deafness into sub-groups. This, in turn, may help us to evolve a more comprehensive conception of its pathological physiology.

PROCEEDINGS OF ACADEMY MEETINGS

STATED MEETINGS

Thursday Evening, May 3, at 8:30 o'clock

I. Executive Session
Election of Fellows

II. Paper of the Evening
The Future of Surgery, Walton Martin

Special Meeting of the Academy

Wednesday Evening, May 9, at 8:30 o'clock

Under the auspices of the Committee on Public Health Relations

ORDER

Outdoor Cleanliness and Street Conditions

1. Introductory remarks, Samuel W. Lambert, President, The New York Academy of Medicine
2. The view-point of the physician and citizen, B. Sachs, Chairman, Subcommittee on Street Conditions
3. The public's interest in a clean city, John H. Finley, LL.D.
4. Outdoor housekeeping, Mrs. F. I. Vernon Griffith, N. Y. Federation of Women's Clubs
5. Dust and respiratory disease, Harlow Brooks
6. Dust and dirt as a source of serious eye ailments, Walter E. Lambert
7. The street cleaning problem from the engineer's point of view, George A. Soper, Ph.D.

Thursday Evening, May 17, at 8:30 o'clock

Program presented in cooperation with the Section of Medicine

ORDER

I. Executive Session
Election of Fellows

II. Papers of the Evening

a. The relation of focal infection to chronic arthritis, Russell L. Cecil

b. The progress of specific therapy in pneumococcus pneumonia, Horace S. Baldwin

Discussion, R. Garfield Snyder

III. Executive Session, Section of Medicine

a. Report of nomination committee

b. Election of officers

Election of Officers: For Chairman—Ralph H. Boots; for Secretary—James Ralph Scott

Section Meetings

Section of Dermatology and Syphilis

Tuesday Evening, May 1, at 8:30 o'clock

ORDER

I. Presentation of Patients
   a. Cases from the Good Samaritan Dispensary, Department of Dermatology and Syphilology, B. Lapowski, Abraham Walzer
   b. Cases from the Cornell Skin Clinic, Service of Hans J. Schwartz
   c. Miscellaneous cases

II. Discussion

III. Executive Session
   Election of Officers: For Chairman—Isadore Rosen; for Secretary—Ray H. Rulison

Section of Surgery

Friday Evening, May 4, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases
   a. A large twisted teratoma in a child four years old, simulating acute appendicitis, Martin J. Loeb
   b. Internal fixation of fractures by means of fascia lata sutures, 2 cases, Russell H. Patterson
   c. Inversion of tumor of Meckel's diverticulum in an ileocecal intussusception, H. B. Eisberg

III. Papers of the Evening
   a. Painful abdominal scars (with neuromata), Frederic W. Bancroft
   b. Surgical pathology of goitre. A comparison with the clinical phenomena in 173 cases. Lantern slides, Paul W. Aschner, Leo Edelman

IV. General Discussion

V. Executive Session
   Election of Officers: For Chairman—Edward D. Truesdell; for Secretary—William Crawford White

Section of Neurology and Psychiatry

Tuesday Evening, May 8, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Case Report
   Report of a case illustrating the early diagnostic significance of the encephalogram, E. D. Friedman

III. Papers of the Evening

a. The surgical treatment of glossopharyngeal neuralgia with remarks on the distribution of the glossopharyngeal nerve, Byron Stookey

b. Unusual infections of the central nervous system, Josephine B. Neal

IV. Executive Session

Election of Officers: For Chairman—Junius W. Stephenson; for Secretary—*James H. Huddleson, Moses Keschner.

*Withdrawn.

Section of Pediatrics

Thursday Evening, May 10, at 8:00 o'clock

(promptly)

Clinical Meeting

I. Presentation of Cases

II. Executive Session

Election of Officers: For Chairman—Stafford McLean; for Secretary—Frank Elmer Johnson

Section of Otology

Friday Evening, May 11, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases

a. Unusual case of chronic mastoiditis, John Horn

b. Short reports of five interesting cases of acute mastoiditis, Clarence H. Smith

III. Paper of the Evening

The finding of contraction of the visual field in progressive deafness, with report of cases, Mark J. Gottlieb

Discussed by Sigmund A. Agatston

IV. General Discussion

V. Executive Session

Election of Officers: For Chairman—Clarence H. Smith; for Secretary—James Garfield Dwyer

Section of Genito-Urinary Surgery

Wednesday Evening, May 16, at 8:30 o'clock

ORDER

I. Presentation of Cases

By Urological Staff of Bellevue Hospital

a. Brief resumé of four cases of bone tumors with associated renal symptoms (lantern slides), G. A. Cashman (by invitation)

b. 1. Transplantation of ureters into the bowel (2 cases)
2. Leukoplacia in a diverticulum of the bladder (lantern slides), A. R. Stevens

c. Electric excision of prostatic bar; recent observations (lantern slides), C. W. Collings

d. Cases of calculi of the urethra, M. S. Rohde

e. Spinal anaesthesia in kidney and ureteral operations, H. S. Jeck

f. Renal calculi, (a) bilateral, (b) in an infected hydronephrotic segment of a horse-shoe kidney (lantern slides), J. J. Valentine

g. Renal pelvis obstruction due to aberrant vessels (lantern slides), W. H. McNeil, Jr.

h. Ureteral obstruction in children (lantern slides), M. F. Campbell

II. Executive Session

Election of Officers: For Chairman—J. Sturdivant Read; for Secretary—Archie L. Dean, Jr.

Section of Orthopedic Surgery

Friday Evening, May 18, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Demonstration

X-ray films illustrating the effect of radium poisoning on joints, Robert E. Humphries

III. Papers of the Evening

a. Vertebral variations, Theodore A. Willis, Cleveland (by invitation) Discussion by Russell A. Hibbs, Samuel Kleinberg

b. A report on the treatment of hip joint disease at the State Orthopedic Hospital for Children, John J. Nutt

IV. Executive Session

Election of Officers: For Chairman—Elmer P. Weigel; for Secretary—Armitage Whitman

Section of Ophthalmology

Monday Evening, May 21, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Clinical Cases

a. Multiple dermoids of the limbus, John H. Dunnington

b. Essential atrophy of the iris, Sol Slomka (by invitation)

c. Kruckenberg's Spindle, Benjamin Friedman (by invitation)

d. Sclerosis of circle of Willis with simple optic nerve atrophy, Harry A. Goalwin (by invitation)

III. Demonstration of ophthalmological x-rays, George S. Dixon

IV. Paper of the Evening
Ocular involvement in sinus diseases, Edgar S. Thomson
Discussion, J. E. Mackenty, E. Ross Faulkner, John M. Wheeler

V. Executive Session
Election of Officers: For Chairman—Bernard Samuels; for Secretary—Thomas H. Johnson

Section of Obstetrics and Gynecology

Tuesday Evening, May 22, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Instruments
a. Further simplifications of tubal insufflation, Adolph Jacoby
b. A new instrument for coagulation diathermy of the cervix and a method of dosage, Frank M. Ende
Discussion by Edward W. Pinkham

III. Papers of the Evening
a. A clinical study of acute pelvic infections seen at Bellevue Hospital, Frederick C. Holden
b. Puerperal morbidity and mortality, P. Brooke Bland, Philadelphia (by invitation)

IV. General Discussion

V. Executive Session
a. Report of nomination committee
b. Election of officers

Section of Laryngology and Rhinology

Wednesday Evening, May 23, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Case Report
Nasal polypi in an 8 year old child, Alfred Michaelis

III. Presentation
Tamponing of the nose, John Horn

IV. Paper of the Evening
Pathology and differential diagnosis of diseases of the maxillary sinus (lantern slides), G. W. Mackenzie, Philadelphia (by invitation)
Discussion, Duncan Macpherson, Joseph H. Abraham, Andrew A. Eggston, E. Ross Faulkner, Frederick M. Law

V. Executive Session
Election of Officers: For Chairman—Westley M. Hunt, David H. Jones; for Secretary—Edward Frankel, Jr.

NOTES

Academy Collection of Portraits

The Academy has a collection of portraits of all its former presidents and a number of prominent physicians. It is desirous of having portraits of artistic merit of distinguished members of the medical profession. Portraits of physicians of unusual artistic value are also sought. The limitations of space in the building do not permit the permanent hanging of every portrait in the Academy's collections. Portraits should be usually not larger than 45″ x 34″ or smaller than 32″ x 24″, which are the most suitable size for hanging. Frames should be about 4″ in width.

The Academy has recently acquired by donation, portraits of the late Dr. Stephen Smith and Dr. Wliliam H. Park, a Vice-president of the Academy.

Fellows Elected May 3, 1928

Reuel Allen Benson .....115 East 61st Street
George Ernest Binkley .....449 Park Avenue
Charles Winfield Buvinger.....50 Washington St., East Orange, N. J.
Samuel Allison Cosgrove.....254 Union Street, Jersey City, N. J.
Joseph B. D'Oronzio .....117 East 39th Street
A. Milton Goldman .....121 East 60th Street
Charles Goldman.....1501 Union Street, Brooklyn
Herman Horn .....105 East 15th Street
Lee Rice Pierce .....17 East 38th Street
Willian Rosenson .....142 West 87th Street
William F. C. Steinbugler .....815 Park Avenue
Abraham Tow .....215 West 75th Street

Fellows Elected May 17, 1928

Sol Biloon .....2021 Grand Concourse
Henry W. Cattell .....Cookstown, New Jersey
Samuel Adams Cohen .....130 West 86th Street
Hanibal DeBellis .....316 West 18th Street
Joseph P. Eidson .....114 East 40th Street
William Elser .....New York Hospital

John Norris Evans.....23 Schermerhorn Street, Brooklyn
Joseph Stanton Hory .....391 East 149th Street
Harvey B. Matthews.....643 St. Mark's Avenue, Brooklyn
Andrew Harp Montgomery .....114 East 62nd Street
Vincent Anthony Nardiello .....233 Lafayette Street
Elliott Norton .....101 East 54th Street
Alfred Owre .....302 East 35th Street
Charles A. Perilli .....105 West 11th Street
Thomas F. Reilly.....20 Maple Street, Springfield, Mass.
Maurice N. Richter .....114 East 66th Street
Lewis Byrne Robinson .....40 East 83rd Street
Morton Ryder.....1 Grandview Avenue, Rye, N. Y.
Sidney P. Schwartz .....130 East 94th Street
Benjamin White Seaman.....Hempstead, New York
Gregory Shwartzman .....664 West 163rd Street
Jesse Feiring Williams .....501 West 120th Street

And For Associate Fellowship

William J. Gies, Ph.D.....632 West 168th Street
Margaret Morris Hoskins, Ph.D.....209 East 23rd Street
Gustave Joseph Noback, Ph.D.....338 East 26th Street
Bissell Barbour Palmer, Jr., D.D.S.....667 Madison Avenue
Bertram Garner Smith, Ph.D.....338 East 26th Street
John C. Torrey, Ph.D.....414 East 26th Street

RECENT ACCESSIONS TO THE LIBRARY

Academia nacional de medicina de Buenos Aires. Libro de oro ofrecido al Prof. Dr. Domingo Cabred. 15. de Diciembre de 1927.
Buenos Aires, Buffarini, 1928. 596 p.

Alexander, J. Thought-control in everyday life.
N. Y., Funk, 1928. 261 p.

Bacon, R. The opus majus of . . .
Phila., Univ. of Penn. pr., 1928. 2 vols.

Baronaki, E. Les néoplasmes.
Paris, Maloine, 1927. 135 p.

Berman, L. The glands regulating personality.
2. ed. N. Y., Macmillan, 1928. 341 p.

Beuttner, O. Technik der periotonealen Wundbehandlung des weiblichen Beckens.
Zürich, Fussli, 1918. 488 p.

Bolognesi, G. & Chiurco, G. A. Le micosi chiruroiche.
Siena, Libr. ed. Senese, 1927. 3 vols.

Budge, Sir E. A. W. The Divine origin of the craft of the herbalist.
Lond., Soc. herbalists, 1928. 96 p.

Burton-Opitz, R. An elementary manual of physiology.
3. ed. Phila., Saunders, 1928. 419 p.

Castaldi, L. Accrescimento corporeo e costituzioni dell'uomo.
Firenze, Niccolai, 1928. 350 p.

Chiray, M. & Pavel, I. La vésicule biliaire.
Paris, Masson, 1927. 568 p.

Claremont, C. A. Intelligence and mental growth.
Lond., Kegan Paul, 1927. 138 p.

Cova, F. Atlas thoracoscopicon.
Mediolanum, Sperling, 1928. 50 plates.

Curschmann, H. Endokrine Krankheiten.
Dresden, Steinkopff, 1927. 151 p.

Daniélopolu, D. L'angine de poitrine et l'angine abdominale.
Paris, Masson, 1927. 443 p.

Dardel, G. De la douleur en chirurgie.
Berne, Franke, 1926. 14 l.

Dombray, P. Diagnostic biologique de la gonococcie.
Paris, Maloine, 1927. 171 p.

Ferrier, J. K. Crooks & crime.
Lond., Seeley, 1928. 314 p.

Garbini, G. Tavole sinottiche di oto-rino-laringoiatria.
Trento, Monauni, 1927. 75 p.

Goepp, R. M. Dental state board questions and answers.
4. ed. Phila., Saunders, 1928. 463 p.

Goodman, H. The basis of light therapy.
2. ed. N. Y., Med. lay press, 1928. 212 p.

Gould's medical dictionary. Ed. by R. J. E. Scott.
2. ed. Phila., Blakiston, 1928. 1507 p.
Greaves, J. E. & Greaves, E. O. Elementary bacteriology.
Phila., Saunders, 1928. 506 p.
Green's manual of pathology and morbid anatomy.
14. ed. Lond., Baillière, 1928. 650 p.
Hall, P. Ultra-violet rays in the treatment and cure of disease.
3. ed. Lond., Heinemann, 1927. 236 p.
Hallé, N. Eléments de philosophie médicale.
Paris, Rivière, 1926. 432 p.
Havet, J. Manuel pratique d'histologie et d'embryologie.
Louvain, Uystpruyst, 1926. 508 p.
Hecht, A. F. Die akute Mittelohrentzündüng als Kinderkrankheit.
Wien, Springer, 1928. 126 p.
Hirszfeld, L. Konstitutionsserologie und Blutgruppenforschung.
Berlin, Springer, 1928. 235 p.
Hollós, J. Tuberculous intoxications.
Edinb., Livingstone, 1928. 132 p.
Jordan, E. O. A text-book of general bacteriology.
9. ed. Phila., Saunders, 1928. 778 p.
Kanner, L. Folklore of the teeth.
N. Y., Macmillan, 1928. 316 p.
Kihn, B. Die Behandlung der quartären Syphilis mit akuten Infektionen.
München, Bergmann, 1927. 339 p.
Laboratoriumsmethoden der Wiener Kliniken. Hrsg. von H. K. Barrenscheen & R. Willheim.
Leip., Deuticke, 1928. 800 p.
Leggett, B. J. The theory and practice of radiology.
Lond., Chapman, 1928. 3 vols.
Leriche, J. Les glandes endocrines et les cancers.
Paris, Maloine, 1927. 51 p.
McGowan, P. J. On Rous, leucotic & allied tumors in the fowl.
Lond., Lewis, 1928. 99 p.
Mainoldi, P. Diagnostica radiologica dei tumori addominali.
Bologna, Cappeli, 1928. 46 p.
Marshall, J. F. Principles and practice of mosquito control.
Hayling Island, Hampshire, Brit. mosquito control inst., 1927. 39 p.
Negro, F. Malattia di Parkinson e sindromi Parkinsoniane.
Torino, Lattes, 1928. 293 p.
Netherlands. Pharmacopoea Nederlandica.
5. ed. 's Gravenhage, Allg. Landdruk, 1926 675 p.
Norman, H. J. Mental disorders.
Edinb., Livingstone, 1928. 463 p.
Oehnell, H. Die Magengeschwürskrankheit.
Dresden, Steinkopff, 1927. 82 p.
Ostwald, W. Lebenslinien. 1905-1927.
Berlin, Klasing, 1927. Pt. 3.

Pagniello, A. I grandi pilastri della guerra.
Torino, Bocca, 1928. 251 p.

Pardee, H. E. B. Clinical aspects of the electrocardiogram.
2. ed. N. Y., Hoeber, 1928. 242 p.

Pelouze, P. S. Gonococcal urethritis in the male.
Phila., Saunders, 1928. 357 p.

Pende, N. Constitutional inadequacies.
Phila., Lea, 1928. 270 p.

Pringsheim, P. Fluorescenz und Phosphorescenz.
3. aufl. Berlin, Springer, 1928. 357 p.

Quintero, J. T. Technique orthodontiqué.
Paris, Baillière, 1928. 416 p.

Radiologie clinique du tube digestif. Pub. sous la direction de MM. P. Duval, J. C. Roux, H. Béclère.
Paris, Masson, 1927. 2 vols.

Roth, I. R. Cardiac arrhythmias.
N. Y., Hoeber, 1928. 210 p.

Santé, L. R. Lobar pneumonia.
N. Y., Hoeber, 1927. 137 p.

Schreiber, E. Ein Tag am Operationsstuhl. Arbeitsmethoden. . . . der . . . Zahnheilkunde.
Berlin, Meusser, 1928. 91 p.

Skelett-tafeln: hrsg. von L. Gerlach.
12. aufl. Erlangen, Palin, 1927. 44 pl.

Sparacio, B. La glandola tiroide in dermatologia.
Bologna, Cappelli, 1928. 45 p.

Stevens, A. A. A manual of the practice of medicine.
12. ed. Phila., Saunders, 1928. 657 p.

Taylor, S. T. The diary of a medical student during the Mid-Victorian period. 1860-1864.
Norwich, Jerrold, 1927. 211 p.

Terrien, F. Chirurgie de l'oeil et de ses annexes.
3. éd. Paris, Masson, 1927. 646 p.

Thurston, W. R. Thurston's philosophy of marriage.
N. Y., Tiffany pr., 1927. 32 p.

Tillmans, J. Lehrbuch der Lebensmittelchemie.
München, Bergmann, 1927. 387 p.

Transactions of the American climatological and clinical association. 1926.

Transactions of the American gynecological society. 1927.

Transactions of the American hospital association. 1927.

Transactions of the American ophthalmological society. 1927.

Transactions of the American surgical association. 1927.

Ueber die katalytischen Wirkungen der lebendigen Substanz. Hrsg. von O. Warburg.
Berlin, Springer, 1928. 528 p.

Van Gehuchten, A. Les maladies nerveuses.
Louvain, Uystpruyst, 1926. 694 p.
Watson, A. McL. A handbook of histology.
Edinb., Livingstone, 1928. 207 p.
Weinberg, M. & Ginsbourg, B. Données récentes sur les microbes anaérobies.
Paris, Masson, 1927. 291 p.
Wheeler, Sir Wm. I. de C. Selected papers on injuries and diseases of bone.
Lond., Baillière, 1928. 148 p.
Wingfield, A. H. Twins and orphans.
Lond., Dent, 1928. 127 p.

DEATHS OF FELLOWS

John S. Billings, A.B., M.D., 1 East 51st Street, New York City; graduated in medicine from the University of Pennsylvania, 1892; elected a Fellow of the Academy February 5, 1903; died April 27, 1928.

Herbert Louis Celler, A.B., M.D., 31 West 86th Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, 1900; elected a Fellow of the Academy January 7, 1909; died April 26, 1928. Dr. Celler was a Fellow of the American Medical Association, and a member of the Pathological Society. He was also Associate Physician at Mt. Sinai Hospital.

Hermann Gustav Klotz, M.D., 300 West 12th Street, New York City; graduated in medicine from the University of Leipzig, Germany, 1868; elected a Fellow of the Academy February 4, 1892; died May 8, 1928. Dr. Klotz was a member of the American Dermatological Society and the New York Dermatological Society. He was also a member of the Alumni Association of Lenox Hill Hospital and Consulting Dermatologist to Lenox Hill Hospital.

John Woodman, M.D., 56 West 56th Street, New York City; graduate in medicine from the College of Physicians and Surgeons, New York City, 1883; elected a Fellow of the Academy December 3, 1908; died May 14, 1928. Dr. Woodman was a member of the American Medical Association.